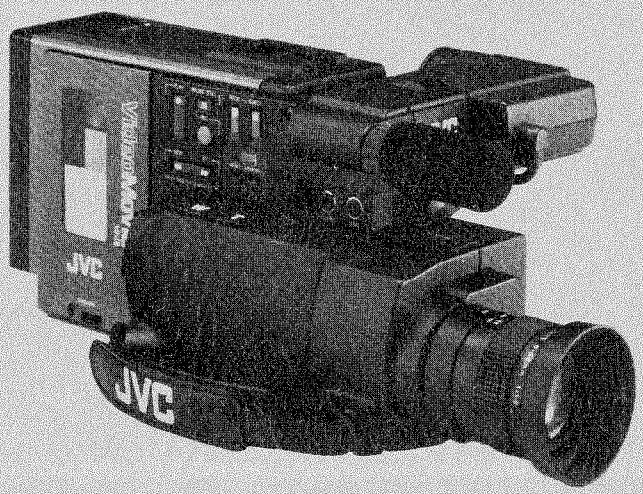
JVC

SERVICE MANUAL

VHS VIDEO MOVIE VHSC

GR-C1 EG AA-P1 EG BB-P1 EG AP P1 E

SCHALTPLÄNE



SPEZIFIKATION

Format	: VHS standard	
Power source	: 9.6 V ⎓	
Power consumption	: 7.6 watts (nominal in the record mode)	
Signal system	: PAL	
Recording system	: Luminance: FM recording Colour: Converted sub-carrier direct recording Conforms to VHS standard	
Cassette	: VHS-C cassette	
Tape speed	: 23.39 mm/sec.	
Recording time Max.	: 30 minutes (with EC-30 cassette)	
Video		
Output	: 1 Vp-p, 75 ohms, unbalanced (via VIDEO/ AUDIO OUT connector)	
S/N ratio	: 40 dB (with Rohde & Schwarz noise meter)	
Audio		
Output	: –6 dBs, 1 k-ohm (via VIDEO/AUDIO OUT connector)	
Microphone input	: –68dBs, 10 k-ohms, unbalanced	
Pick up tube	: 1/2" High-Band Saticon*, single-carrier frequency separation system	
Minimum required illumination	: 15 lux (at f/1.2 with sensitivity switch set to UP)	
Illumination range	: 15 – 100,000 lux (auto iris mode with sensitivity switch set to UP)	
Lens	: f/1.2, f = 8 – 48 mm, 6 : 1 power zoom lens with auto iris control and macro position, filter diameter 49 mm	
Viewfinder	: Electronic viewfinder with 1/2" (12.7 mm) black/white CRT	
Colour temperature switching	: Switchable filter (3,200 K/5,200 K)	
White balance adjustment	: Automatic/preset standard	
Operating temperature	: 0°C to +40°C	
Operating humidity	: Less than 80%	
Storage temperature	: –20°C to +30°C	
Weight	: 1.9 kg (with viewfinder)	
Dimensions	: 108 (W) x 136 (H) x 314 (D) mm (excl. viewfinder, lens hood and battery pack) 176 (W) x 136 (H) x 340 (D) mm (incl. viewfinder, lens hood and NB-P5U battery pack)	

*Saticon is a registered trademark.

Design and specifications subject to change without notice.

No. 8361-T1
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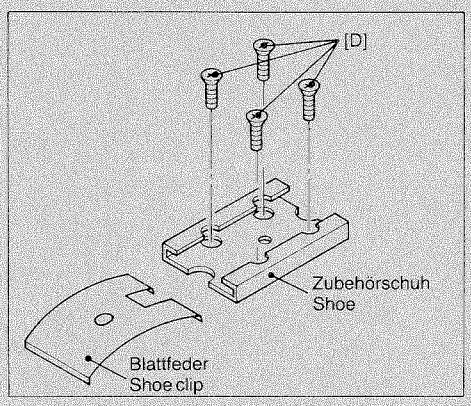
Ausbauhinweise

1. Gehäuse

a) Zuerst die Blattfeder im Zubehörschuh anheben und herausziehen. 4 Schrauben [D] lösen und Zubehörschuh abnehmen.

b) Deckplatte an den Punkten [E] anheben, um die Rastnasen zu lockern und dann in Pfeilrichtung [F] abziehen.



2. Gehäuse

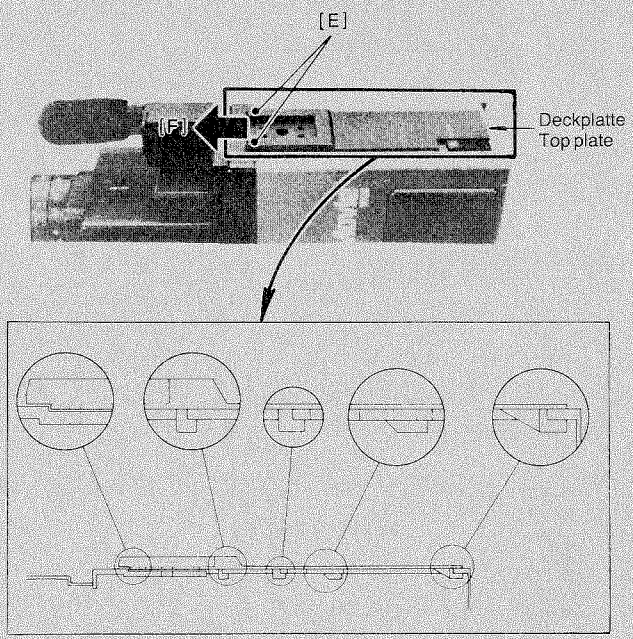
2 Schrauben [G] und 4 Schrauben [H] herausdrehen, um die obere Gehäusehälfte von der unteren zu lösen.

Disassembly

1. Tope plate

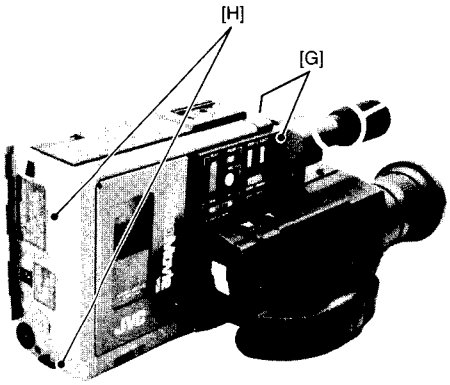
a) First remove the shoe clip by raising the part upwards and pulling it to the front. Then remove the 4 screws [D].

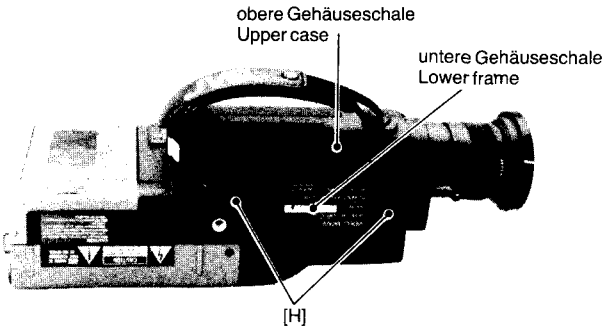
b) Raise the two parts [E] of the top plate to unfasten its claws and then slide it in the direction of [F]:



2. Housing

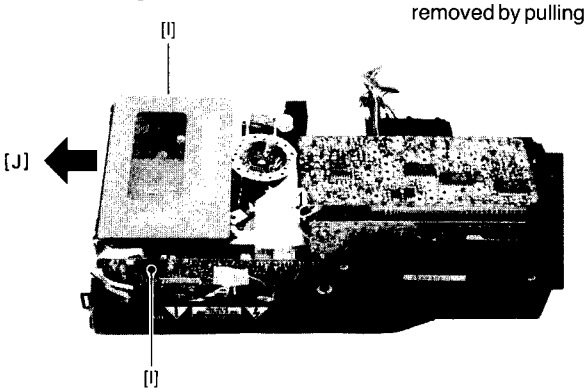
Remove the 2 screws [G] and 4 screws [H] to partially take off the upper case from the lower frame.





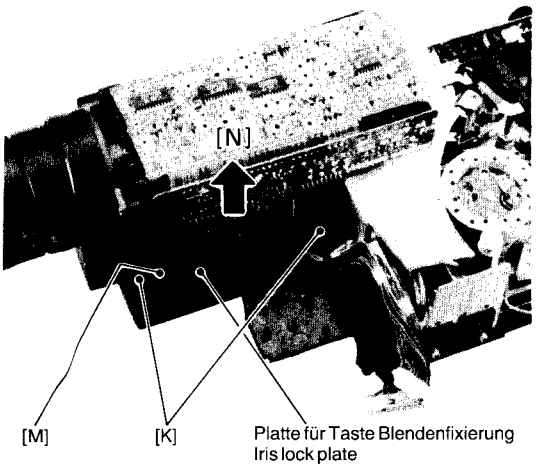
3. Cassettenfach-Abdeckung
2 Schrauben [I] lösen. Cassettenfach-Abdeckung in Pfeilrichtung [J] abziehen.

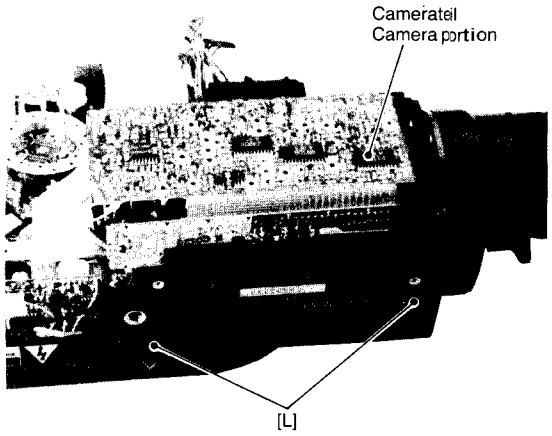
3. Cassette cover
Remove the two screws [I]. Then the cassette cover can be removed by pulling it in the direction of [J].



4. Camerateil
Zunächst 2 Schrauben [K] und 2 Schrauben [L] lösen. Schraube [M] lösen und die Platte für Taste Blendenfixierung in Pfeilrichtung abnehmen. Dann das Camerateil nach oben herausnehmen.

4. Camera portion
Remove the two screws [K] and two screw [L] first, and then remove a screw [M] to remove the iris lock plate by raising it upwards in the direction of [N]. After that, the camera can be removed by raising it upwards.



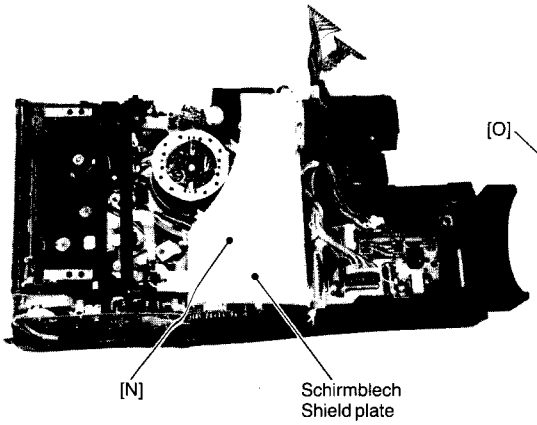


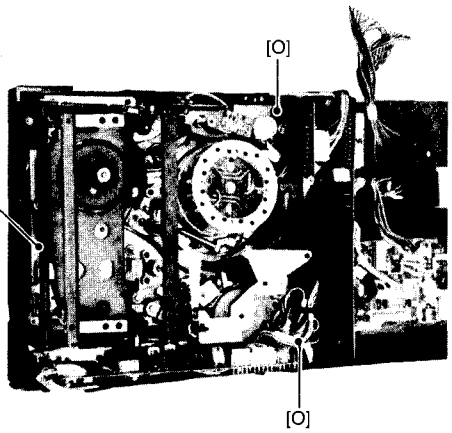
5. Recorderteil
Schraube [N] und Abschirmung entfernen. 3 Schrauben [O] lösen und das Recorderteil nach oben herausnehmen (Stecker [P] abziehen).

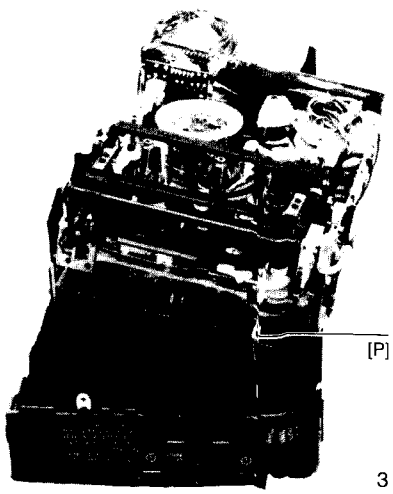
Hinweis: Das Recorderteil sehr vorsichtig herausnehmen, um freiliegende mechanische Teile nicht zu beschädigen.

5. Tape recorder
Remove the screw [N] and the shield plate. Remove the 3 screws [O]. Then remove the deck by pulling it upwards. (Remove connector [P].

Note: When removing the deck, pay the most careful attention not to touch the mechanism partsexposed.



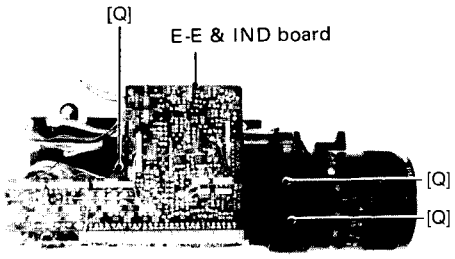




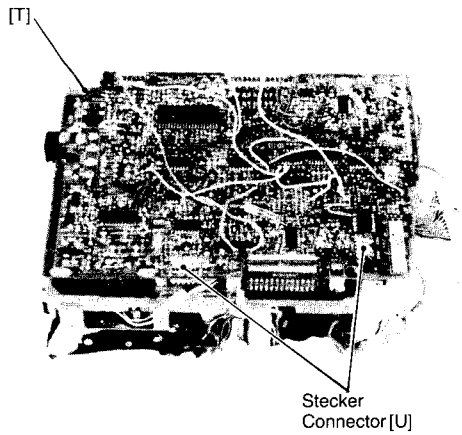
6. **E-E und Anzeigenplatte** [2] [3]
3 Schrauben [Q] lösen und die Schaltungsplatte herausklappen.

7. **Audio-Servoplatte** [0] [4]
7 Stecker [R] abziehen und die Audio/Servoplatte in Pfeilrichtung [S] abziehen. Stecker für den Audio-Kopf abnehmen.

8. **Videoplatte** [0] [2]
nach oben abziehen.



9. **Platte für Servoregelung und Mechaniksteuerung** [0] [1]
Eine Schraube [T] und 2 Stecker [U] entfernen und 3 Stecker [V] abziehen.

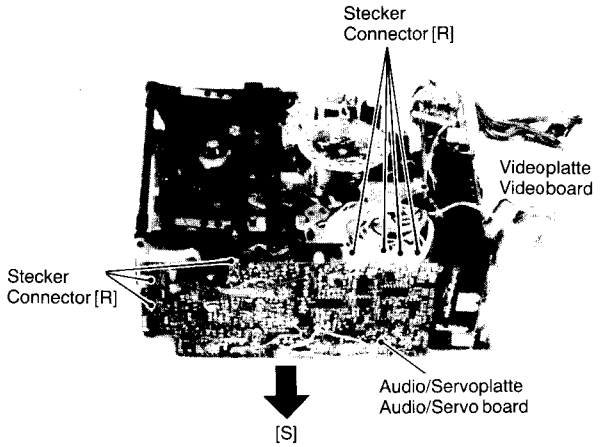


10. **Videokopf-Vorverstärker**
Abschirmung und Schraube [W] entfernen und 8 Kopftrommelzuleitungen ablöten.

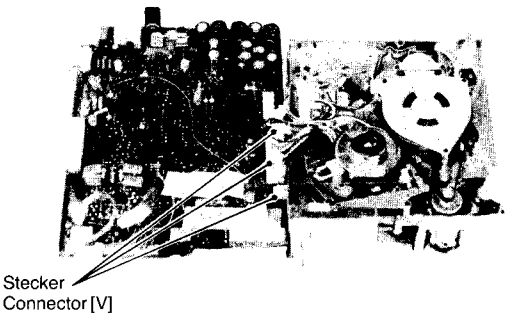
6. **E-E and Indicator board** [2] [3]
Remove the three screws [Q] so that the E-E & IND board can be opened to this side.

7. **Audio-Servo board** [0] [4]
First remove the 7 connectors [R] and then remove the AUDIO/SERVO board by pulling it in the direction of the arrow [S]. Remove the connector for the audio head.

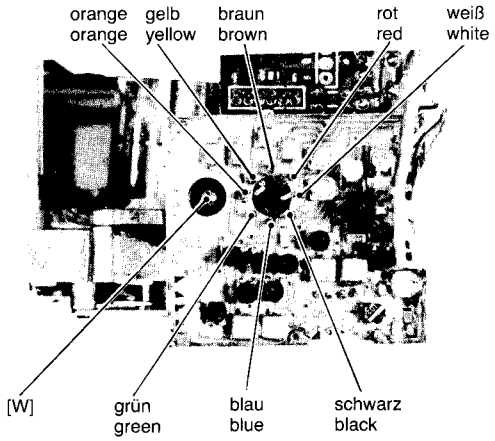
8. **Video board** [0] [2]
Pull out in upwards direction.



9. **Mechacon / Servo board** [0] [1]
Remove a screw [T] and the 2 connectors [U] to remove the MECHACON/SERVO board. Remove 3 connectors [V].



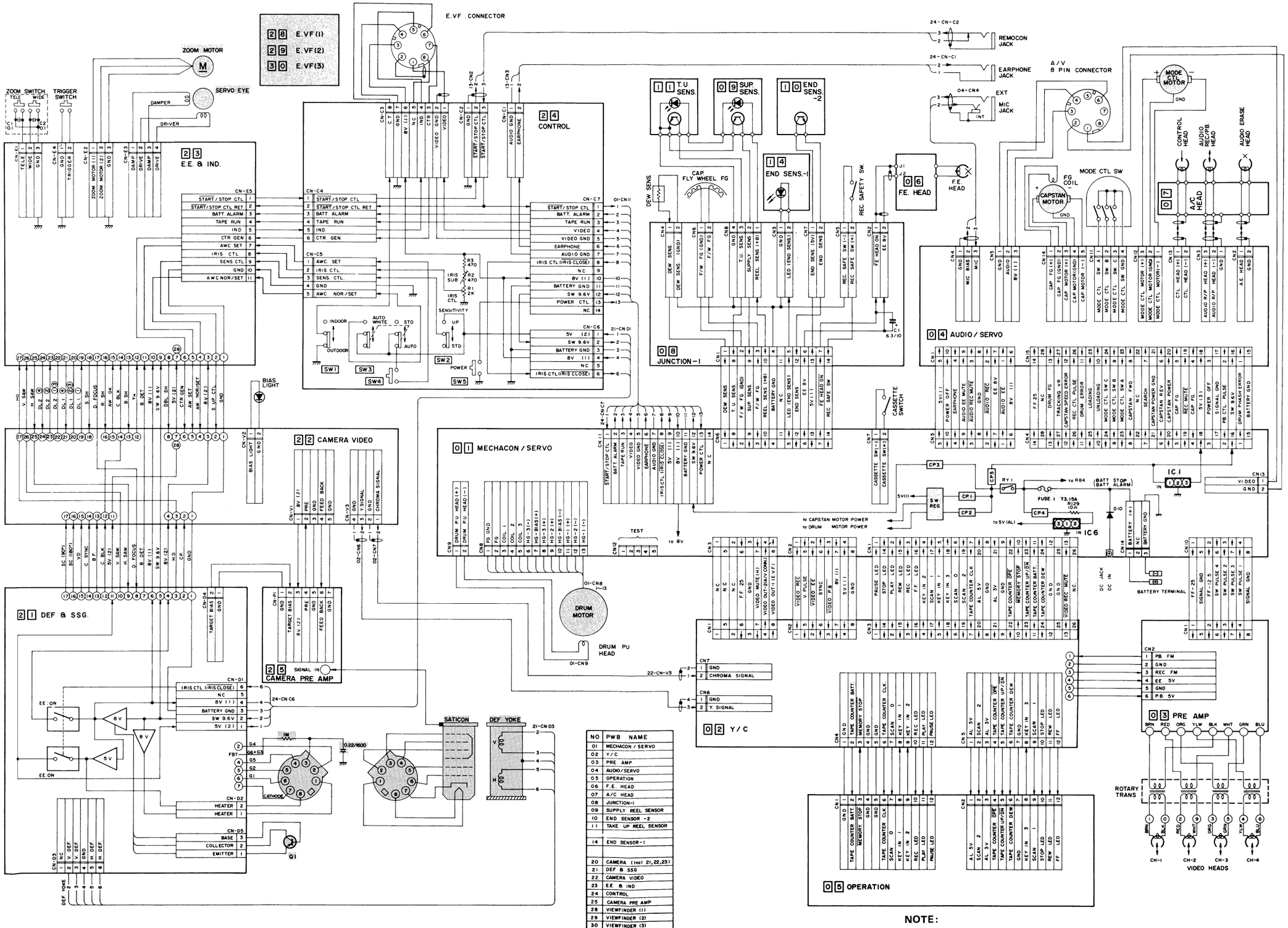
10. **Drum-Preamplifier**
Remove the cover of the shield case, a screw [W] and desolder the eight wires to the drum.



Abkürzungen · Abbreviations

A		
AC	Wechselstrom	*Alternating Current*
ACC	autom. Farbsteuerung	*Automatic Color Control*
A/CTL	Audio/Kontrollkopf	*Audio/Control*
ADD	Addierstufe	*Adder*
ADC	Analog/Digital-Konverter	*Analog Digital Converter*
ADJ	Abgleich	*Adjustment*
A DUB	Nachvertonung	*Audio Dub*
AE	Audio Löschkopf	*Audio Erase*
AEF	autom. Schnittfunktion	*Automatic Editing Function*
AFC	autom. Frequenzsteuerung	*Automatic Frequency Control*
AFT	autom. Feinabstimmung	*Automatic Fine Tuning*
AGC	autom. Verstärkungsregelung	*Automatic Gain Control*
AH	Audio-Kopf	*Audio Head*
AHD	Audio Aufzeichnungsdichte	*Audio High Density*
AL	Nach Einfädeln	*After Loading*
ALC	autom. Lichtkompens. Pegelregelung	*Automatic Light Compensation* *Automatic Level Control*
A/S/M	Audio/Servo/Mechanik-steuerung	*Audio/Servo/Mechacon*
ALM	Alarm	*Alarm*
ALU	arithm. Logikeinheit	*Arithmetic Logic Unit*
AM	Amplituden-Modulation	*Amplitiude Modulation*
AMP	Verstärker	*Amplifier*
ANT	Antenne	*Antenna*
APC	Phasenregelung	*Automatic Pedestal Control* *Automatic Phase Control*
APL	durchschnittl. Videopegel	*Average Picture Level*
ASS'Y	Einheit	*Assembly*
ATT	Abschwächer	*Attenuator*
AUTO	automatisch	*Automatic*
AUX	Reserveeingang	*Auxiliary*
AUD	Audio	*Audio*
AW	autom. Weißabgleich	*Automatic White Balance*
B		
B	Chassis	*Base*
	Schwarz	*Black*
	Blau	*Blue*
BAL	Symmetrie	*Balance*
BATT	Akku	*Battery*
BATT. ALM	Akku-Anzeige	*Battery Alarm*
BBD	Eimerkettenspeicher	*Bucket Brigade Device*
B. BLK	Strahl-Austastung	*Beam Blanking*
BCD	binar codiert dezimal	*Binary Coded Decimal*
BEAM DET	Elektronenstrahldetektor	*Beam Detector*
BEG	Anfang	*Beginning*
BFP	Burst Kennimpuls	*Burst Flag Pulse*
BIT	Bit	*Binary Digit*
BLC	Ruhestromregelung	*Back Light Control*
BLK	schwarz	*Black*
BLU	blau	*Blue*
BNC	BNC-Buchse	*Bayonet Connector*
BOT	Bandanfang	*Beginning of Tape*
BPF	Bandpaß-Filter	*Bandpass Filter*
BRK	Bremse	*Brake*
BRN	braun	*Brown*
BRT	Helligkeit	*Brightness*
BT	Bereichsabstimmung	*Band Tuning*
BW or B/W	schwarz/weiß	*Black and White*
C		
C	Kapazität	*Capacitance*
C	Collector	*Collector*
C (Chromal)	Farbsignal	*Chrominance*
CAP	Bandantrieb	*Capstan*
CAR	Träger	*Carrier*
CARR. BAL	Träger-Balance	*Carrier Balance*
CASS	Cassette	*Cassette*
C. BLX	zusammengesetzter Tastimpuls	*Composite Blanking*
CCD	Eimerkettenverzögerung	*Charge Coupled Device*
CCT	Schaltung	*Circuit*
CdS	Cadmium-Sulfid	*Cadmium Sulphide*
CD	abwärtszählen	*Countdown*
CENT	Mitte	*Center*
CF	Keramikfilter	*Ceramic Filter, Color Frame*
CC	Cassettenschacht	*Cassette Compartment*
CE	Chip Enable	*Chip Enable*
CH	Kanal	*Channel*
CHG	Last	*Charge*
CHROMA	Helligkeitssignal	*Chrominance*
CLK	Takt	*Clock*
CLR	Löschen	*Clear*
CMOS		*Complementary Metal Oxide Silicon*
CMD	Befehl	*Command*
CNT	Zähler	*Count, Counter*
CONV	Umsetzer	*Converter*
COL	Farbe	*Color*
COM	gemeinsamer Anschluß	*Common*
COMB	Zusammensetzung Kammfilter	*Combination* *Comb Filter*
COMP	Vergleichsstufe Zusammengesetzt Ausgleich	*Comparator* *Composite* *Compensation*
CONN	Steckverbinder	*Connector*
CP	Sicherung	*Circuit Protector*
	Klemm-Impuls	*Clamp Pulse*
CPU		*Central Processing Unit*
CRT	Kathodenstrahlröhre	*Cathode Ray Tube*
C. SYNC	Synchronisation	*Composite Synchronization*
C. SUP	Farb-Unterdrückung	*Chroma Suppressor*
CTC	Übersprechdämpfung	*Crosstalk Cancel*
CTL	Regelung	*Control*
CRT. GEN	Schriftgenerator	*Character Generator*
CVBS	FBAS-Signal	*Chrominance, Video, Burst and Sync*
D		
D	Kopftrommel	*Drum*
DAC	Digital/Analog-Konverter	*Digital Analog Converter*
dB	Dezibel	*Decibel*
DC	Gleichstrom	*Direct current*
DCC	Dunkelstromkompensation	*Dark Current Compensator*
DD	Direkt-Antrieb	*Direct Drive*
DEC	Decoder	*Decoder*
DEF	Ablenkung	*Deflection*
DEMOND	Demodulator	*Demodulator*
DEMUX	Demultiplexer	*Demultiplexer*
DET	Detector	*Detector*
DEV	Abweichung	*Deviation*
D. FOCUS	dyn. Focus	*Dynamic Focus*
DFRS	Trommel-Freilauf Stopsignal	*Drum Free RUN STOP*
DIF TRANS	Differential-Transformator	*Differential Transformer*
DISCR	Discriminator	*Discriminator*
DL	Verzögerungsleitung	*Delay Line*
DOC	Dropout Kompensation	*Dropout Compensator*
D. SH	dyn. Shading-Regelung	*Dynamic Shading*
DYAC	Blendenregelung	*Dynamic Aperture Control*
E		
E	Schnitt	*Edit*
	Emitter	*Emitter*
EDP	elektr. Datenverarbeitung	*Electronic Data Processing*
E-E	E-E	*Electric to Electric*
EF	Emitterfolger	*Emitter-Follower*
EMP	Vorverzerrung	*Emphasis*
ENC	Encoder	*Encoder*
EN	Enable	*Enable*
ENV	Hüllkurve	*Envelope*
EOT	Bandende	*End of Tape*
EP	Long Play	*Extended Play*
EQ	Equalizer	*Equalizer*
ES	elektron. Schalter	*Electronic Switch*
ESNS		*End Sensor*
EVF	Sucher	*Electronic Viewfinder*
EXP	Expander	*Expander*
EXT	extern	*External*
F		
F ADV	Bildfortschaltung	*Frame Advance*
F.B.T	Zeilentrafo	*Flyback Transformer*
FDP	Display	*Fluorescent Display Panel*
FE	Voll-Löschkopf	*Full Erase*
FET	FET	*Field Effect Transistor*
FF	schneller Vorlauf	*Fast Forward* *Flipflop*
FG	Frequenzgenerator	*Frequency Generator*
FM		*Frequency Modulation*
FMA	frequenzmod. Audiosignal	*FM Audio*
FR	Vollbildaufnahme	*Full Recording Frame*
FREQ	Frequenz	*Frequency*
F V CONV	Frequ./Spg-Konverter	*Frequency to Voltage Converter*
FWD	vorwärts	*Forward*
G		
G	Gate	*Gate*
	grün	*Green*
	Gitter-Elektrode	*Grid*
GEN	Generator	*Generator*
GND	Masse	*Ground*
GRN	grün	*Green*
GRY	grau	*Gray*
H		
H	High-Pegel (1)	*High*
	Horizontal	*Horizontal*
HBF	horiz. Burst Kennimpuls	*Horizontal Burst Flag Pulse*
H. CENT	horiz. Mitte	*Horizontal Center*
HD	horiz. Treiberimpluls	*Horizontal Drive Pulse*
HG	Hallgenerator	*Hall Generator*
H. LIN	horiz. Linearität	*Horizontal Linearity*
HP	horiz. Parabelimpuls	*Horizontal Parabolic Pulse*
HPF	Hochpaßfilter	*High-pass Filter*
HS	horiz. Sägezahn	*Horizontal Sawtoothed Pulse*
HV	Hochspannung	*High Voltage*
H. WIDTH	Bildbreite	*Horizontal Width*
I		
IC	integrierte Schaltung	*Integrated Circuit*
ID	Kennimpuls	*Identification (Pulse)*
IF	ZF	*Intermediate Frequency*
IFR	Infrarot	*Infrared*
IFT	ZF-Übertrager	*Intermediate Frequency Transformer*
IND	Anzeige	*Indicator*
INH	Inhibit	*Inhibit*
INS	Insertschnitt	*Insert*
INT	intern	*Internal*
INV	Inverter	*Inverter*
I/O	Eingang/Ausgang	*Input/Output*
IR	Infrarot	*Infared*
K		
K	Kathode	*Cathode*
L		
L	Low-Pegel (0)	*Low*
LED		*Light Emitting Diode*
LIN	Linearität	*Linearity*
LIM	Begrenzer	*Limiter*
LOAD	Einfädeln	*Loading*
LP	Langspielgeschwindigkeit	*Long Play*
LPF	Tiefpaßfilter	*Low-pass Filter*
LSB	unteres Seitenband	*Lower Sideband*
M		
M	Motor	*Motor*
MANU	manuell	*Manual*
MAX	maximum	*Maximum*
MDA	Motortreiberverstärker	*Motor Drive Amplifier*
MECHACON	Mechaniksteuerung	*Mechanism Control*
MIC	Mikrofon	*Microphone*
MIN	Minimum	*Minimum*
MIX	Mischstufe	*Mixer*
MMV	Monomultivibrator	*Monostable Multivibrator*
MOD	Modulator	*Modulator*
MODEM	Modulator-Demodulator	*Modulator-Demodulator*
MON	Monitor	*Monitor*
MOS	MOS	*Metal Oxide Silicon*
MPX	Multiplexer	*Multiplexer*
MS	Betriebsartwahl	*Mode Select*
MUT	Tonabschaltung	*Muting*
N		
NAND	Not-And	*Not-And*
NC	nicht belegt	*Not Connected*
ND	Dämpfungsfilter	*Neutral Density (Filter)*
NFB	Gegenkopplung	*Negative Feedback*
NLN	nicht linear	*Non-Linear*
NO	normalerweise offen	*Normally Open*
NOR	normal	*Normal*
O		
OB	optischer Schwarzwert	*Optical Black*
OPAMP	Operationsverstärker	*Operational Amplifier*
OP	optisch	*Optical*
ORN	orange	*Orange*
OSC	Oszillator	*Oscillator*
P		
PAR	Parabel	*Parabola*
PB	Wiedergabe	*Playback*
PC	Photokoppler	*Photocoupler*
PCM	Puls-Code-Modulation	*Pulse Code Modulation*
PED	Schwarzwert	*Pedestal*
PGM	Programm	*Program*
PG	Impulsgenerator	*Pulse Generator*
PI	Lichtschranke	*Photo Interrupter*
PLL	Phasenregelkreis	*Phase Locked Loop*
p-p	Spitze-Spitze	*Peak-to-Peak*
POS	Position	*Position*
PR	Andruckrolle	*Pinch Roller*
PREAMP	Vorverstärker	*Preamplifier*
PRL	Umschwenken (Zwischenrad)	*Preroll*
P/S	Pause/Standbild	*Pause/Still*
PSC	Impuls-Anstiegssteuerung	*Pulse Swallowing Control*
PU	Aufnehmer	*Pickup*
PWB	Schaltungsplatte	*Printed Wiring Board*
PWM	Pulsbreitenmodulation	*Pulse Width Modulation*
PWR	Stromversorgung	*Power*
Q		
Q	Güte	*Quality Factor*
R		
R	rot	*Red*
RA	Widerstands-Array	*Resistor Array*
RAM	RAM	*Random Access Memory*
REC	Aufnahme	*Recording*
REF	Bezug, Referenz	*Reference*
REG	Regler	*Regulator*
REMOCON	Fernsteuerung	*Remote Control*
REV	Vertauschung	*Reverse*
REW	Rückspulen	*Rewind*
RF	HF	*Radio Frequency*
RS FF	RS Flipflop	*RS Flipflop*
RST	rücksetzen	*Reset*
R/P	Aufnahme/Wiedergabe	*Record/Playback*
RPT	Wiederholung	*Repeat*
RT	Rotationsübertrager	*Rotary Transformer*
RUN	Bandlauf	*Running*
RY	Relais	*Relay*
S		
SAW	Sägezahnspannung	*Sawtooth*
SC	Sub-Träger	*Subcarrier*
SCH	Suchlauf	*Search*
SEL	Auswahl	*Select*
SENS	Sensor	*Sensor*
SENS CTL	Empfindlichkeitsregelung	*Sensitivity Control*
SEP	Trennung	*Separation*
SF	Sourcefolger	*Source Follower*
SFF	kurzes Vorspulen	*Short Fast Forward*
SFWD	Suchlauf vorwärts	*Search Forward*
SH	Farbschattierung	*Shading*
SIF	Ton-ZF	Sound Intermediate Frequency
SN	Signal/Rausch-Abstand	*Signal to Noise Ratio*
SOL	Magnet	*Solenoid*
SOS	Ton-Mischbetrieb	*Sound on Sound*
SP	Normalspiegelgeschwindigk.	*Standard Play*
SR	Abwickelspulenteller	*Supply Reel*
SREV	Suchlauf rückwärts	*Search Reverse*
SREW	kurzes Rückspulen	*Short Rewind*
S/S	Zeitlupe/Standbild	*Slow/Still*
SSG	Synchron-Impulsgenerator	*Sync Signal Generator*
S. SH	statische Farbschattierung	*Static Shading*
SSNS	Startsensor	*Start Sensor*
STD	Normal	*Standard*
SUP	Abwickelspule	*Supply*
SW	Schalter	*Switch*
SWD	geschaltet	*Switched*
SW REG	Schaltregler	*Switching Regulator*
SYNC	Synchronisation	*Synchronization*
SYNC SEP	Synchronimpuls Trennstufe	*Sync Separator*
SYSCON	System-Überwachung	*System Control*
V		
V	vertikal	*Vertical*
VCO	spannungsgesteuerter Oszillator	*Voltage Controlled Oscillator*
VD	vert. Treiberimpuls	*Vertical Drive Pulse*
VP	vert. Parabelimpuls	*Vertical Paraboric Pulse*
VR	Poti	*Varable Resistor*
VS	vert. Sägezahnimpuls	*Vertical Sawtoothed Pulse*
VXO	steuerbarer Quarzoszillator	*Variable Crystal Oscillator*
VLT	violett	*Violet*
V/T	Video/Fernsehen	*Video/Television*
V/U	VHF/UHF	*VHF/UHF*
VSCH	variable Suchlaufgeschw.	*Variable Search*
W		
WARN	Warnanzeige	*Warning*
W. BAL	Weißabgleich	*White Balance*
WHT	weiß	*White*
WV	Arbeits-Spannung	*Working Voltage*
W & D	weiß und schwarz	*White and Dark*
X		
XTAL	Quarz	*Crystal*
Y		
Y	Luminanzsignal	*Luminance*
YEL	gelb	*Yellow*
YL	Y-Signal, schmalbandig	*Luminance Low Band Signal*
YW	Y-Signal, breitbandig	*Luminance Wide Band Signal*

Verdrahtungsplan · Wiring Diagram

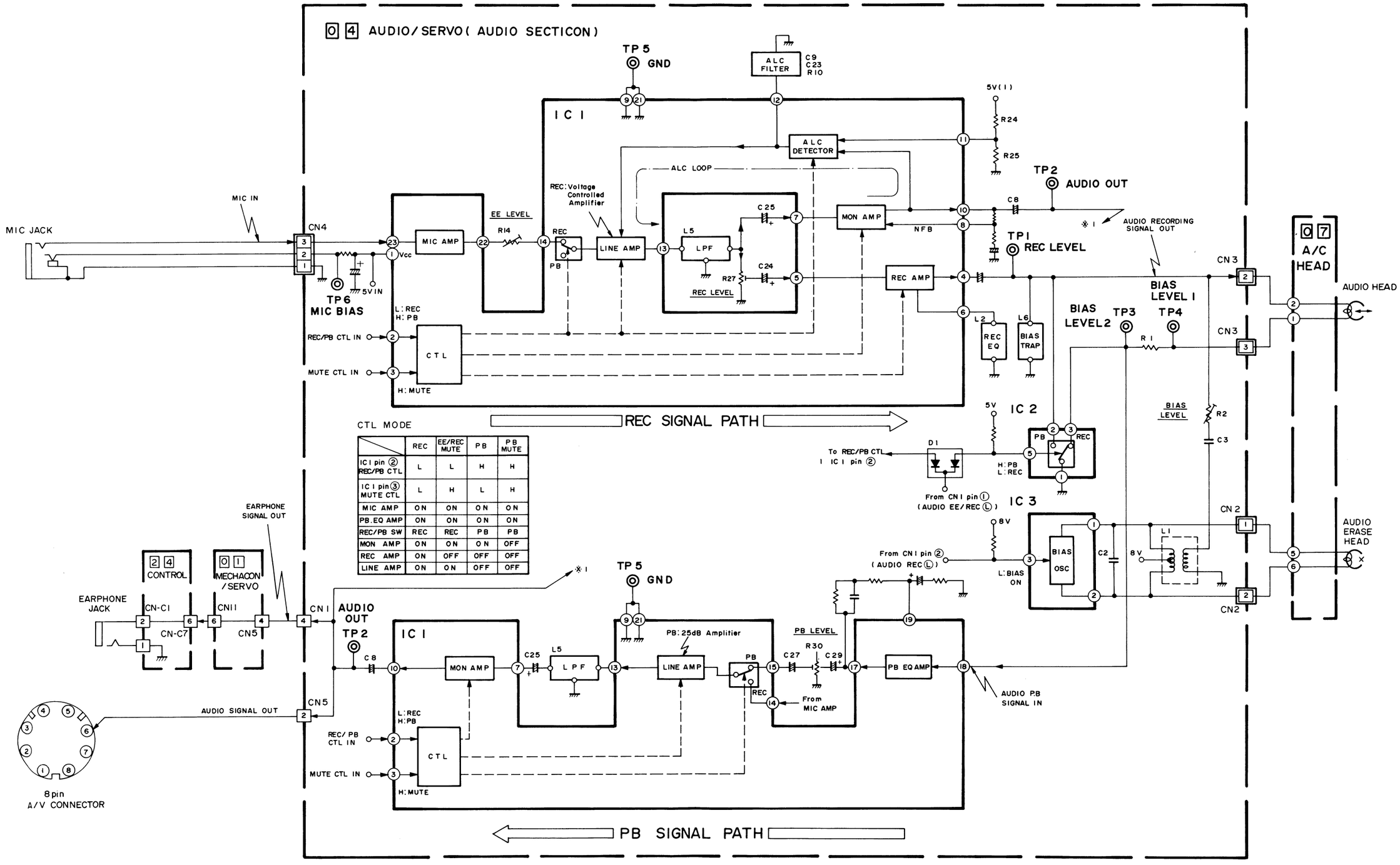


NO	PWB NAME
01	MECHACON / SERVO
02	Y/C
03	PRE AMP
04	AUDIO/SERVO
05	OPERATION
06	F.E. HEAD
07	A/C HEAD
08	JUNCTION-I
09	SUPPLY REEL SENSOR
10	END SENSOR -2
11	TAKE UP REEL SENSOR
14	END SENSOR-I
20	CAMERA (incl 21,22,23)
21	DEF & SSG
22	CAMERA VIDEO
23	EE & IND
24	CONTROL
25	CAMERA PRE AMP
28	VIEWFINDER (1)
29	VIEWFINDER (2)
30	VIEWFINDER (3)

NOTE:

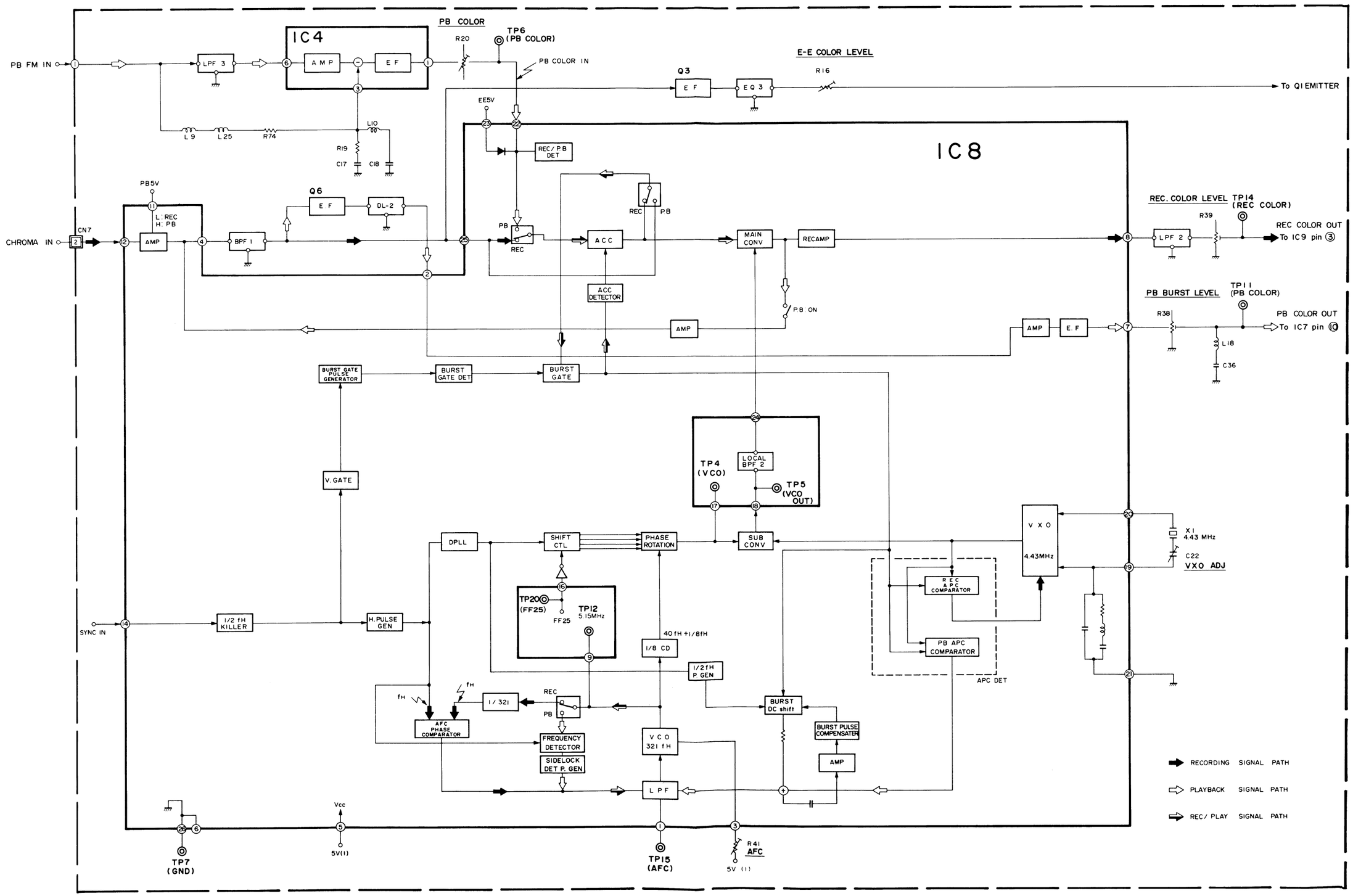
parts are importantly related to safety.
When replacing them, make sure to use specified parts.

Audio-Blockschaltbild
Audio block diagram

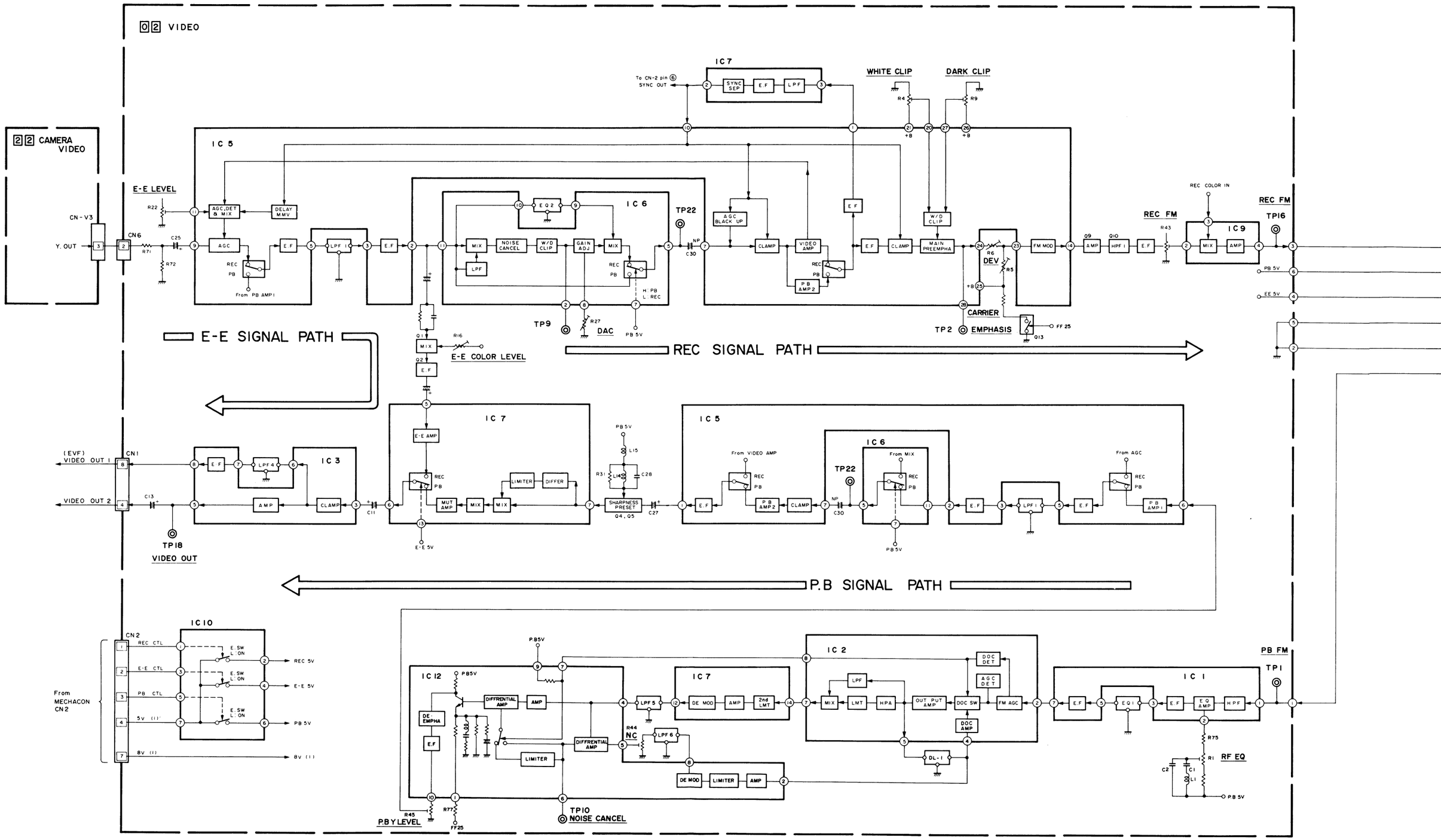


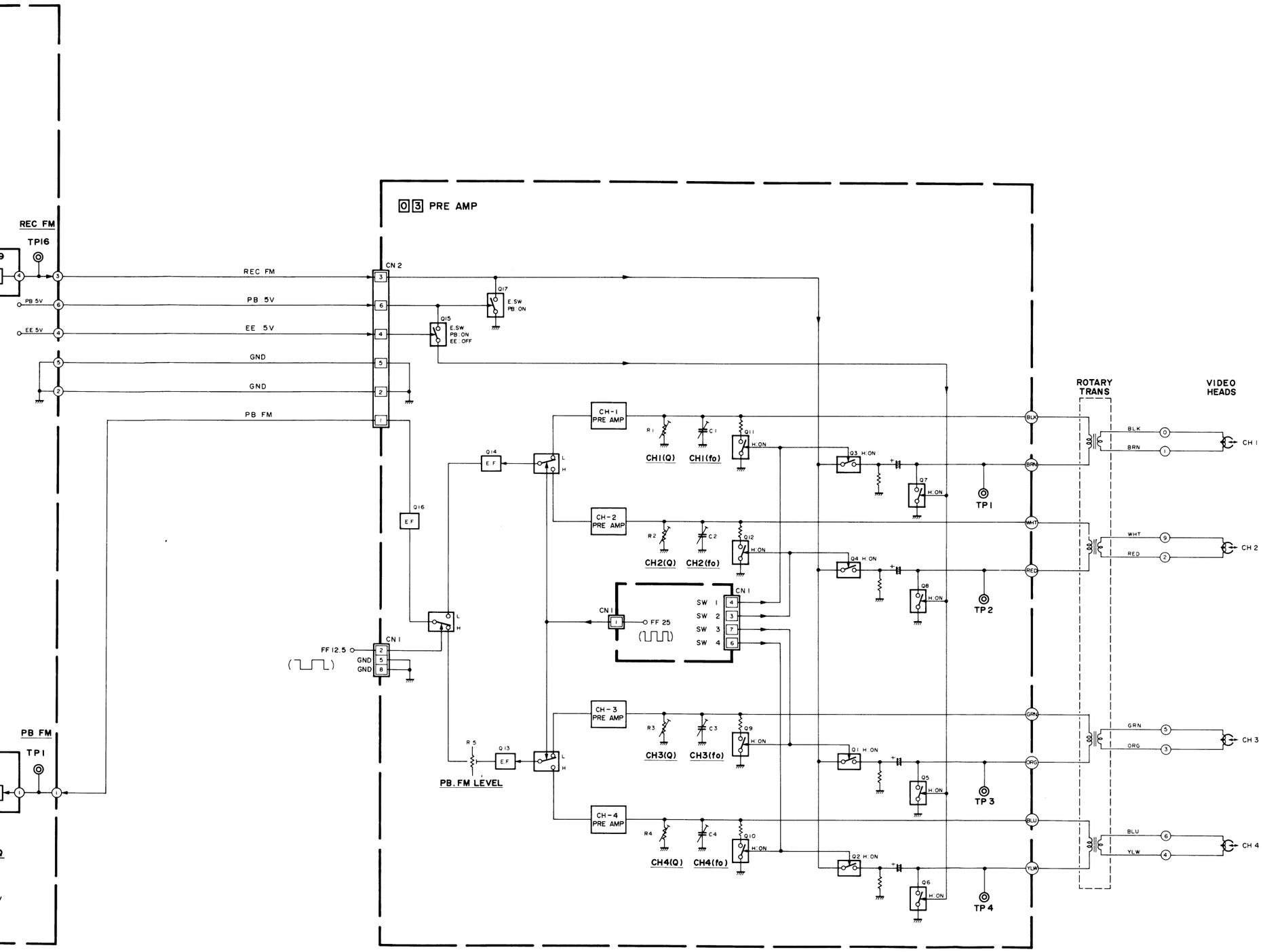
CTL MODE	REC	EE/REC MUTE	PB	PB MUTE
IC1 pin ② REC/PB CTL	L	L	H	H
IC1 pin ③ MUTE CTL	L	H	L	H
MIC AMP	ON	ON	ON	ON
PB.EQ AMP	ON	ON	ON	ON
REC/PB SW	REC	REC	PB	PB
MON AMP	ON	ON	ON	OFF
REC AMP	ON	OFF	OFF	OFF
LINE AMP	ON	ON	OFF	OFF

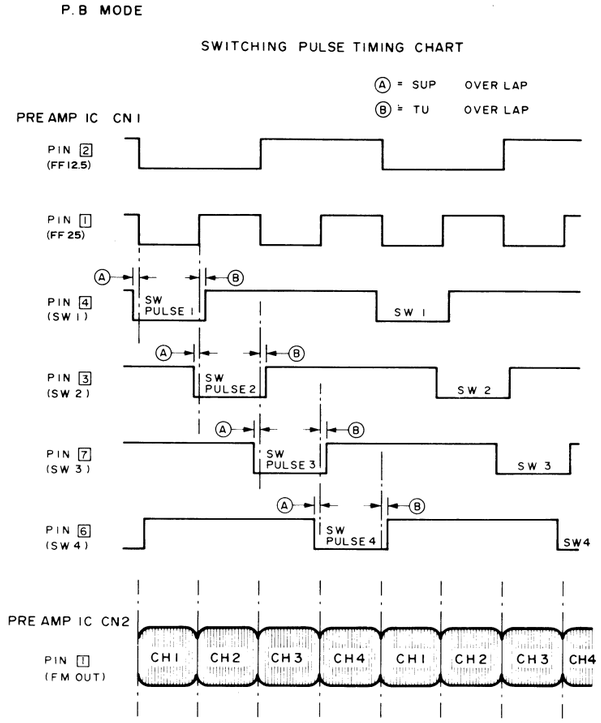
Video-Blockschaltbild (Farbsignal)
Video block diagram (chroma signal)



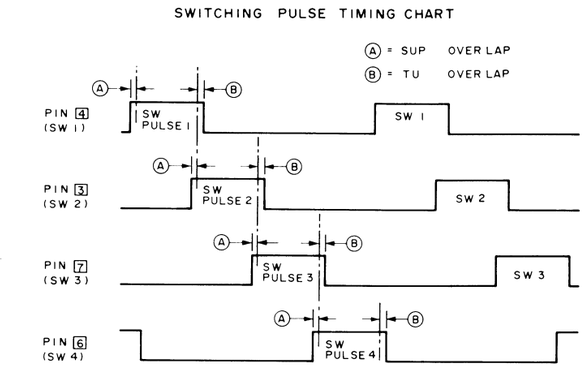
Video-Blockschaltbild (Luminanzsignal)
Video block diagram (luminance signal)



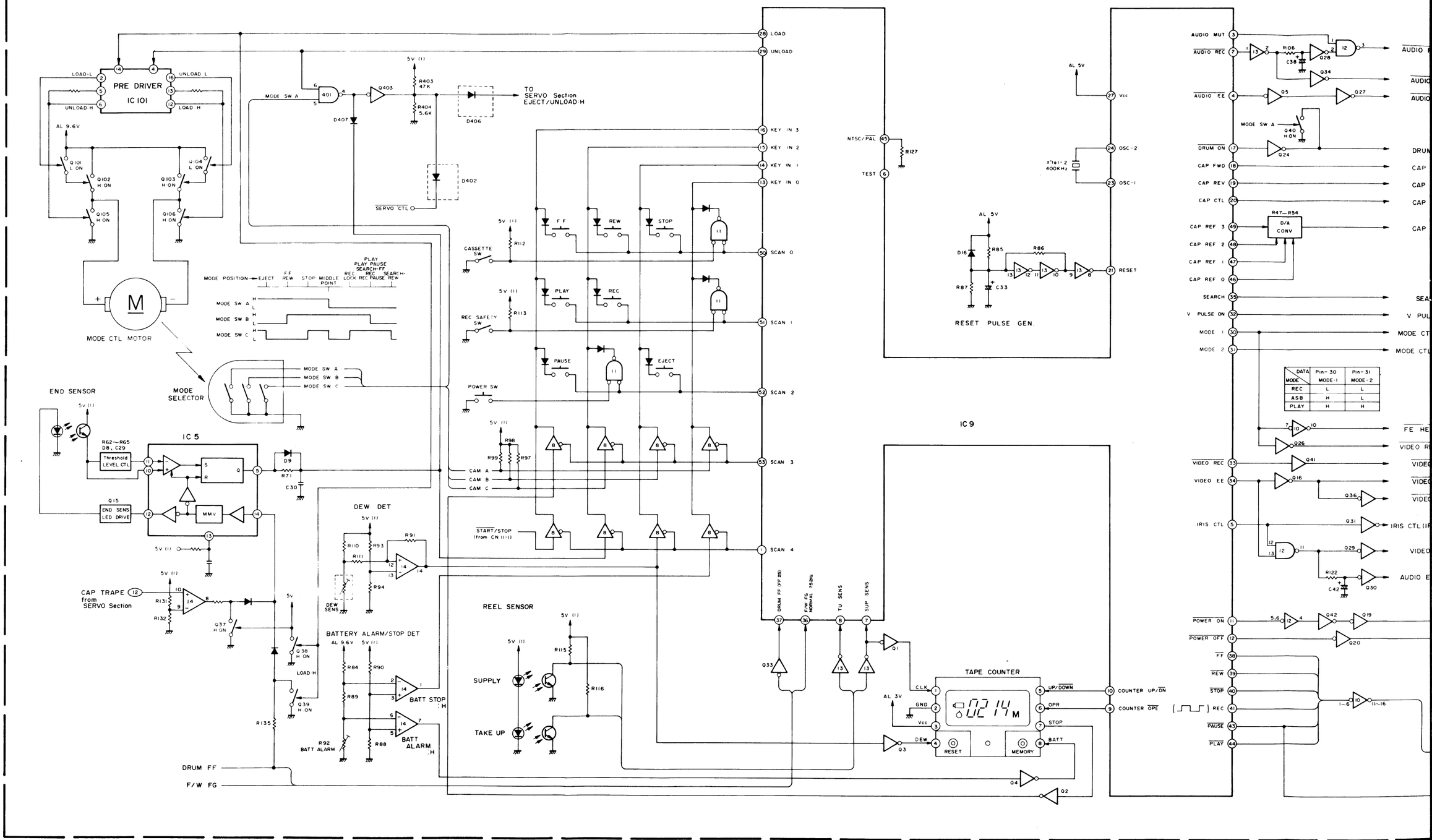

REC FM
TP16
PB FM
TP1
PB 5V
EE 5V
GND
GND
PB FM
03 PRE AMP
CN 2
REC FM
PB 5V
EE 5V
GND
GND
PB FM
Q17
E.SW
PB :ON
Q15
E.SW
PB :ON
EE :OFF
CH-1
PRE AMP
CH-2
PRE AMP
CH-3
PRE AMP
CH-4
PRE AMP
R1
C1
CH1(Q)
CH1(fo)
R2
C2
CH2(Q)
CH2(fo)
R3
C3
CH3(Q)
CH3(fo)
R4
C4
CH4(Q)
CH4(fo)
Q11
H:ON
Q12
H:ON
Q9
H:ON
Q10
H:ON
Q14
E.F
Q16
E.F
Q13
E.F
R5
PB.FM LEVEL
L
H
CN1
FF 12.5
GND
GND
FF 25
SW 1
SW 2
SW 3
SW 4
Q3 H:ON
Q4 H:ON
Q1 H:ON
Q2 H:ON
Q7
H:ON
Q8
H:ON
Q5
H:ON
Q6
H:ON
TP1
TP2
TP3
TP4
ROTARY
TRANS
VIDEO
HEADS
BLK
BRN
WHT
RED
GRN
ORG
BLU
YLW
CH 1
CH 2
CH 3
CH 4


P.B MODE
SWITCHING PULSE TIMING CHART
Ⓐ = SUP OVER LAP
Ⓑ = TU OVER LAP
PRE AMP IC CN1
PIN 2
(FF12.5)
PIN 1
(FF 25)
PIN 4
(SW 1)
PIN 3
(SW 2)
PIN 7
(SW 3)
PIN 6
(SW 4)
SW
PULSE 1
SW 1
SW
PULSE 2
SW 2
SW
PULSE 3
SW 3
SW
PULSE 4
SW4
PRE AMP IC CN2
PIN 1
(FM OUT)
CH1
CH2
CH3
CH4
CH1
CH2
CH3
CH4

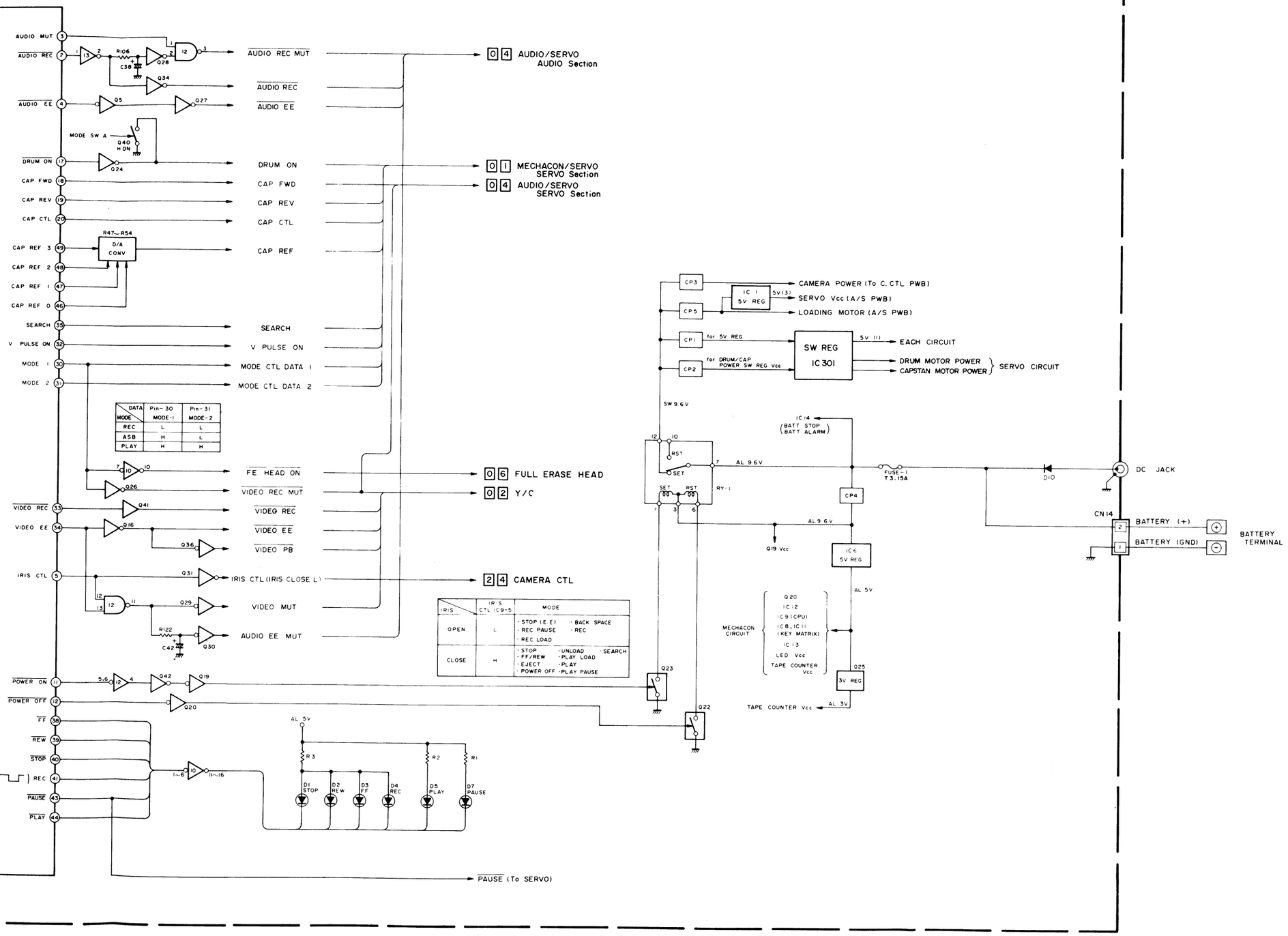
REC MODE


SWITCHING PULSE TIMING CHART
Ⓐ = SUP OVER LAP
Ⓑ = TU OVER LAP
PIN 4
(SW 1)
PIN 3
(SW 2)
PIN 7
(SW 3)
PIN 6
(SW 4)
SW
PULSE 1
SW 1
SW
PULSE 2
SW 2
SW
PULSE 3
SW 3
SW
PULSE 4

Mechaniksteuerung Blockschaltbild
Mechacon block diagram

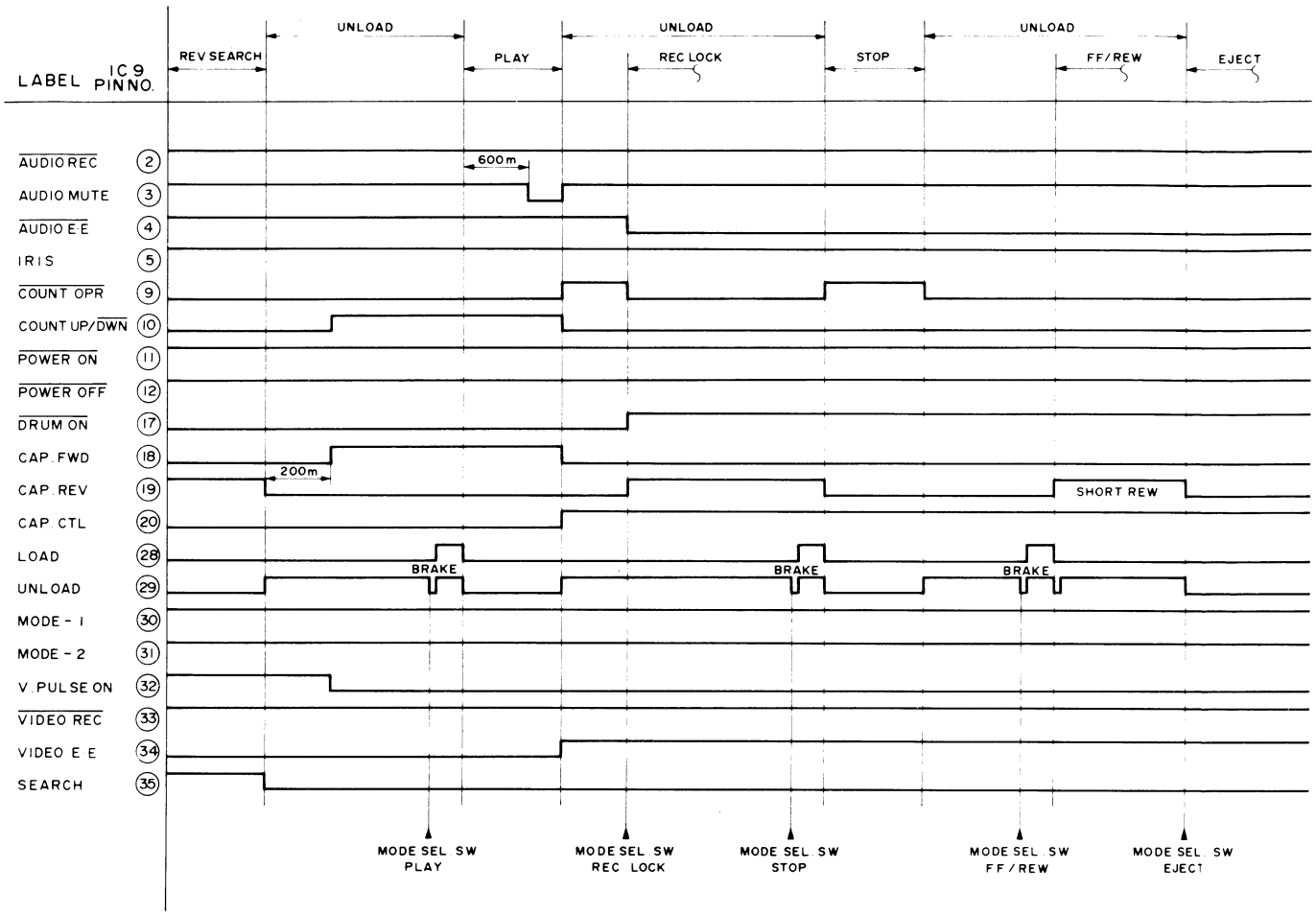


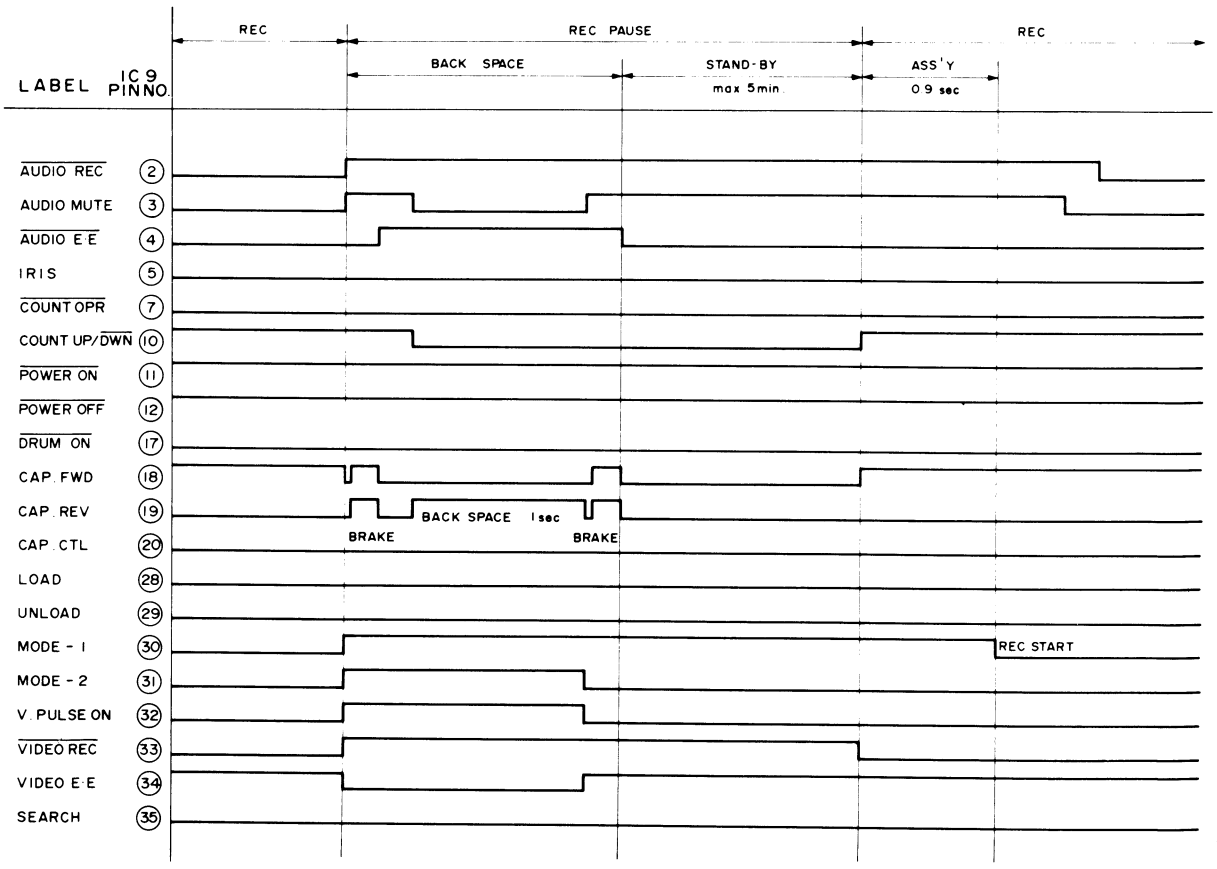
Mechaniksteuerung Blockschaltbild
Mechacon block diagram



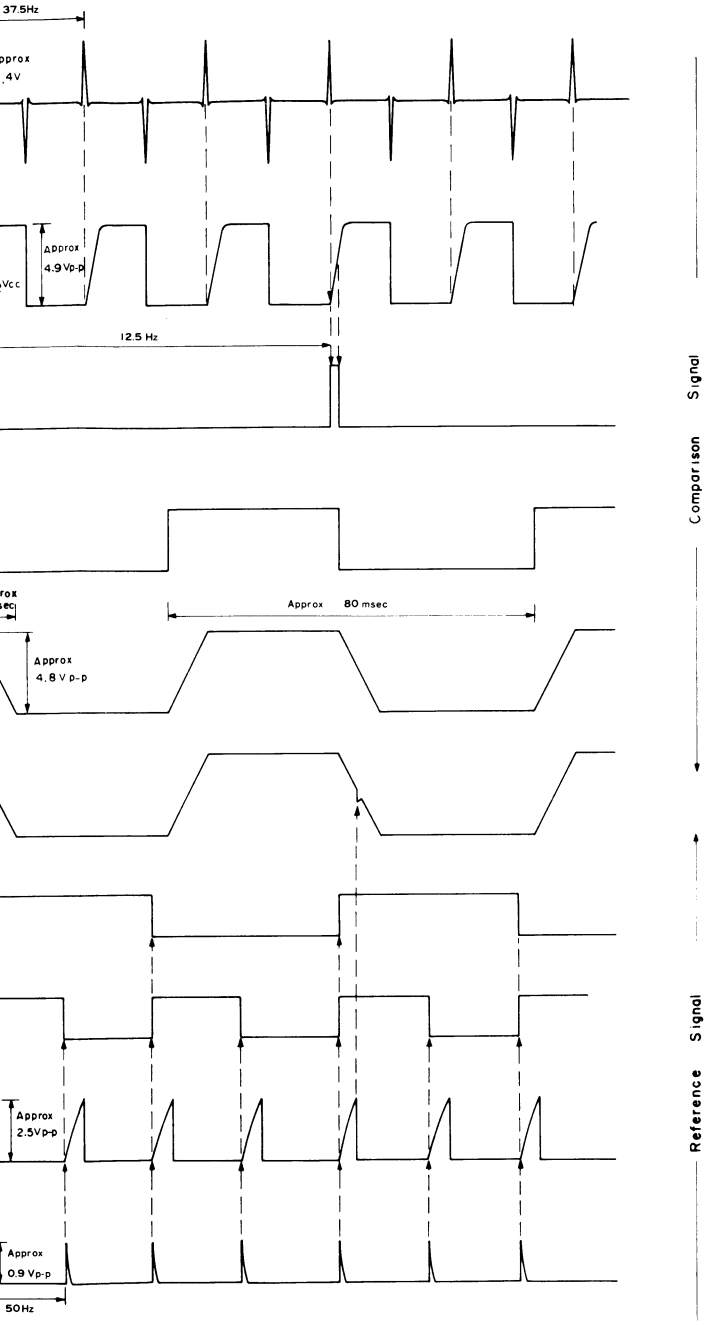
DATA / MODE	Pin-30 MODE-1	Pin-31 MODE-2
REC	L	L
ASB	H	L
PLAY	H	H

IRIS	IRIS CTL (C9-5)	MODE
OPEN	L	· STOP (E.E) · BACK SPACE · REC PAUSE · REC · REC LOAD
CLOSE	H	· STOP · UNLOAD · SEARCH · FF/REW · PLAY LOAD · EJECT · PLAY · POWER OFF · PLAY PAUSE

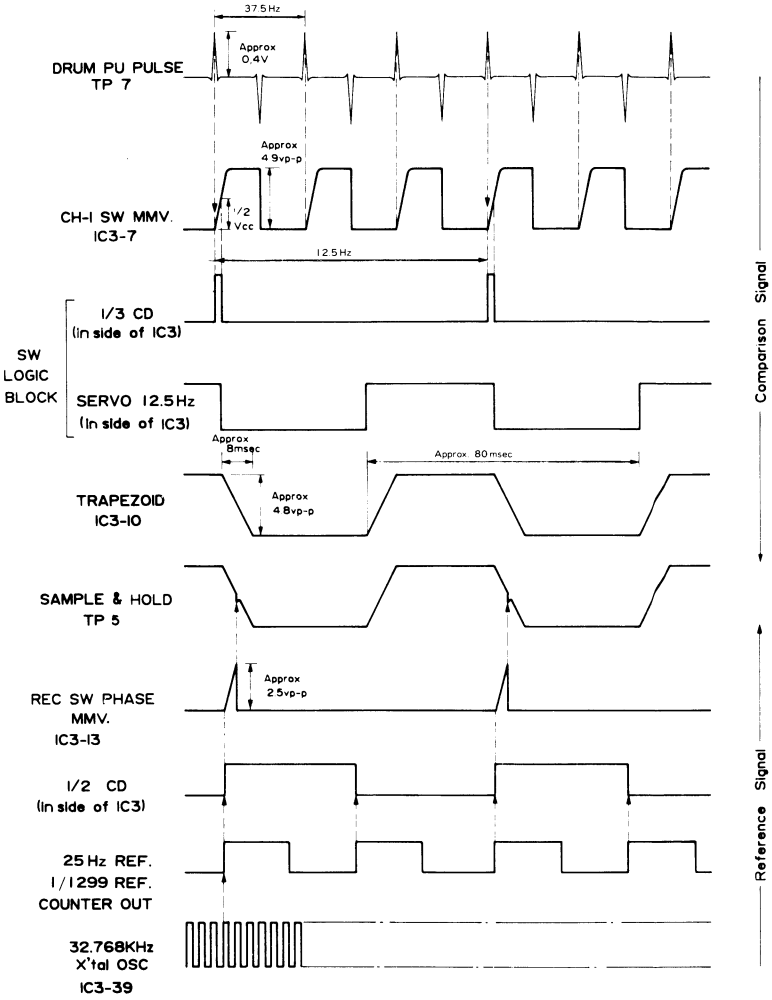

LABEL IC9 PINNO.
REV SEARCH
UNLOAD
PLAY
UNLOAD
REC LOCK
STOP
UNLOAD
FF/REW
EJECT
AUDIO REC (2)
AUDIO MUTE (3)
AUDIO E·E (4)
IRIS (5)
COUNT OPR (9)
COUNT UP/DWN (10)
POWER ON (11)
POWER OFF (12)
DRUM ON (17)
CAP FWD (18)
CAP REV (19)
CAP CTL (20)
LOAD (28)
UNLOAD (29)
MODE - 1 (30)
MODE - 2 (31)
V PULSE ON (32)
VIDEO REC (33)
VIDEO E·E (34)
SEARCH (35)
600m
200m
SHORT REW
BRAKE
BRAKE
BRAKE
MODE SEL SW PLAY
MODE SEL SW REC LOCK
MODE SEL SW STOP
MODE SEL SW FF/REW
MODE SEL SW EJECT


LABEL IC9 PINNO.
REC
REC PAUSE
REC
BACK SPACE
STAND-BY
max 5min
ASS'Y
0.9 sec
AUDIO REC (2)
AUDIO MUTE (3)
AUDIO E·E (4)
IRIS (5)
COUNT OPR (7)
COUNT UP/DWN (10)
POWER ON (11)
POWER OFF (12)
DRUM ON (17)
CAP FWD (18)
CAP REV (19)
CAP CTL (20)
LOAD (28)
UNLOAD (29)
MODE - 1 (30)
MODE - 2 (31)
V PULSE ON (32)
VIDEO REC (33)
VIDEO E·E (34)
SEARCH (35)
BRAKE
BACK SPACE 1sec
BRAKE
REC START

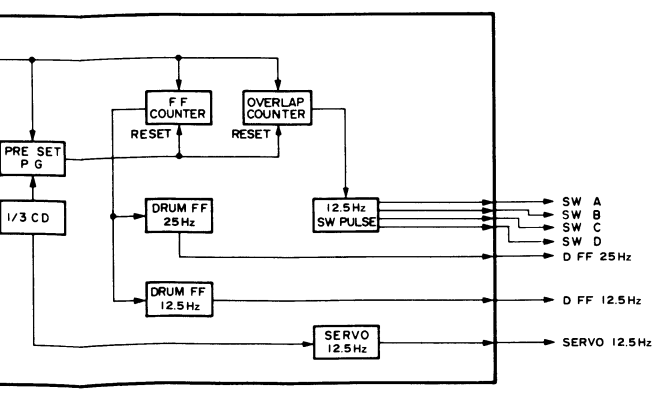
Aufnahme
REC mode

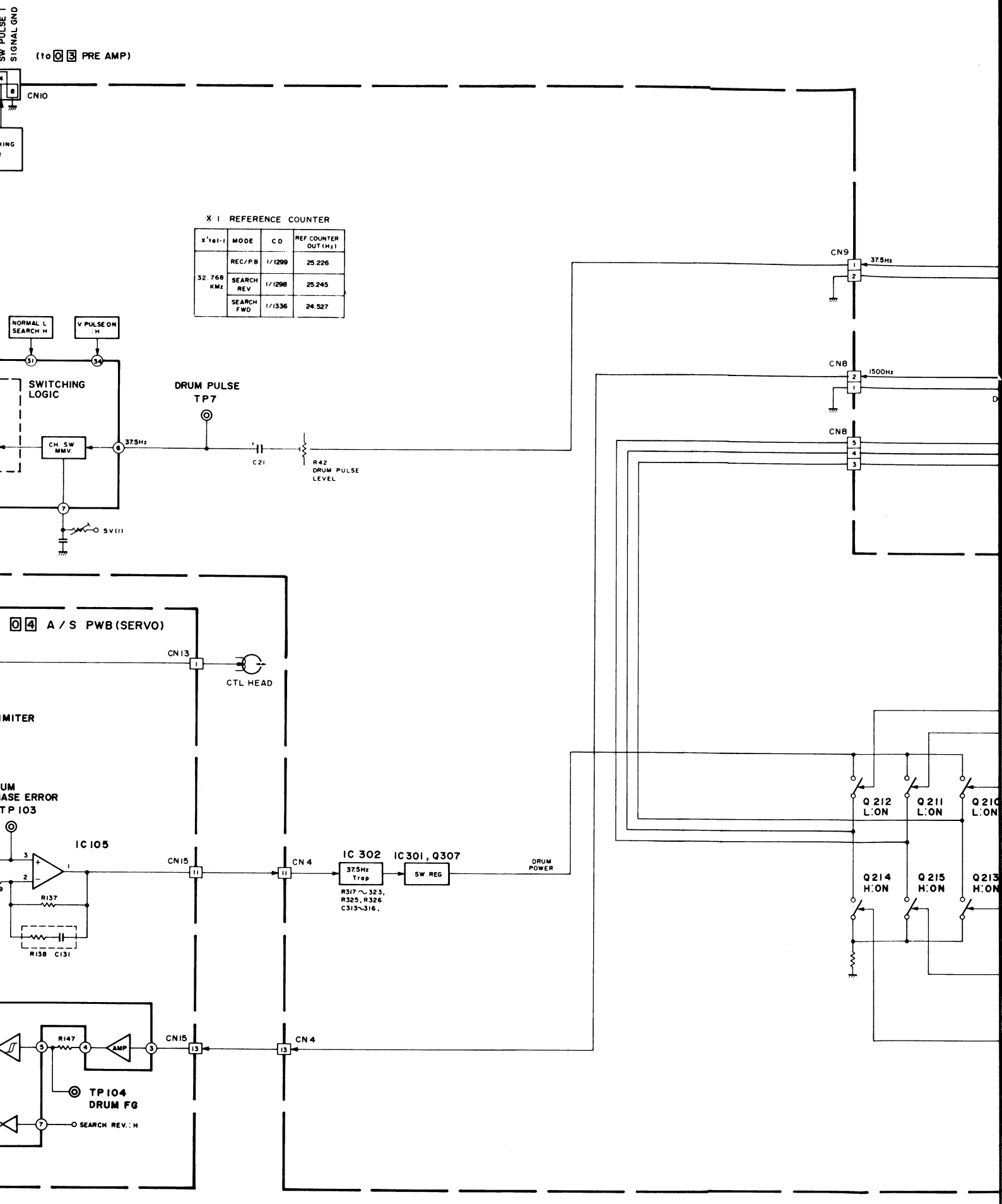


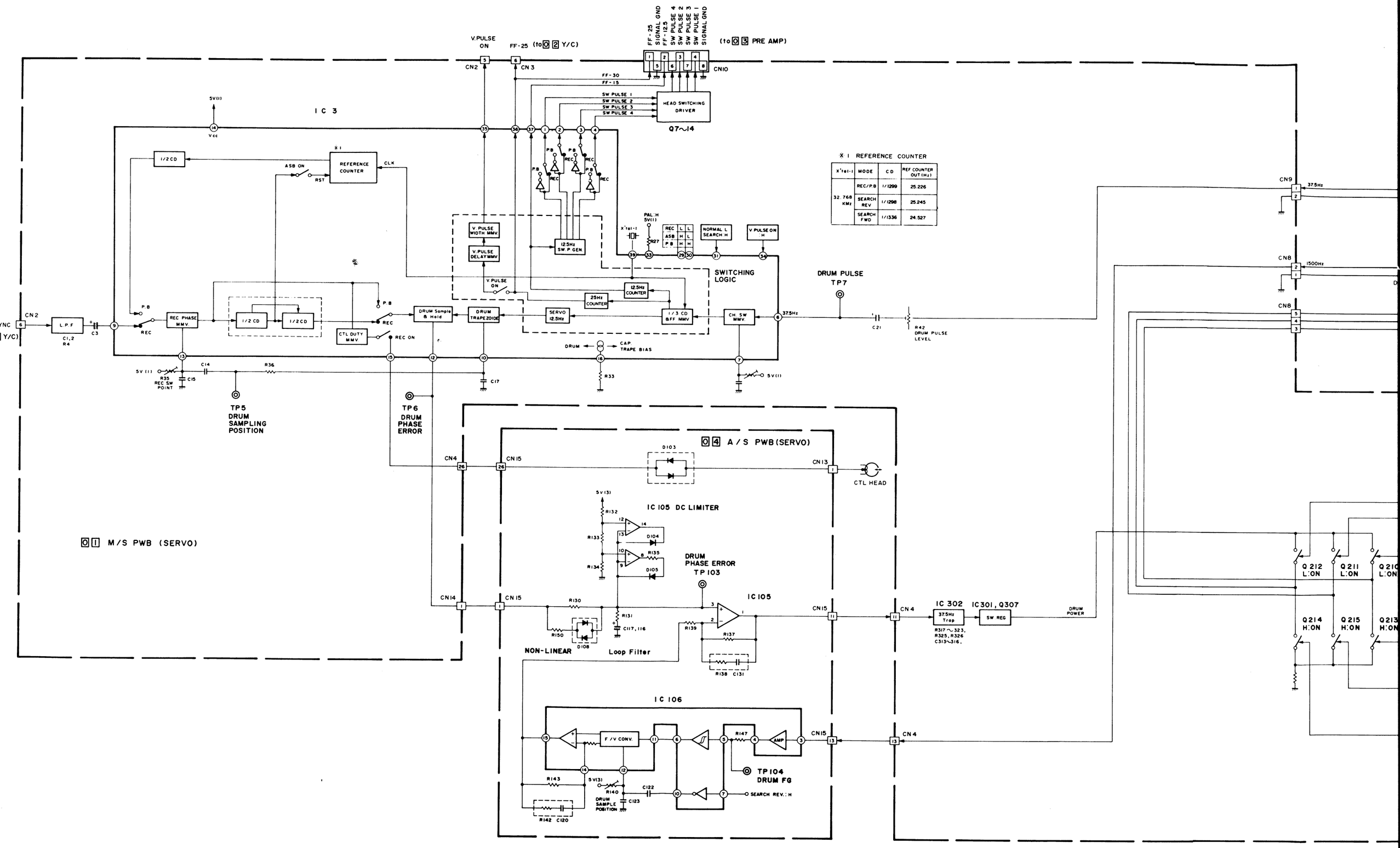
Wiedergabe
PB Mode



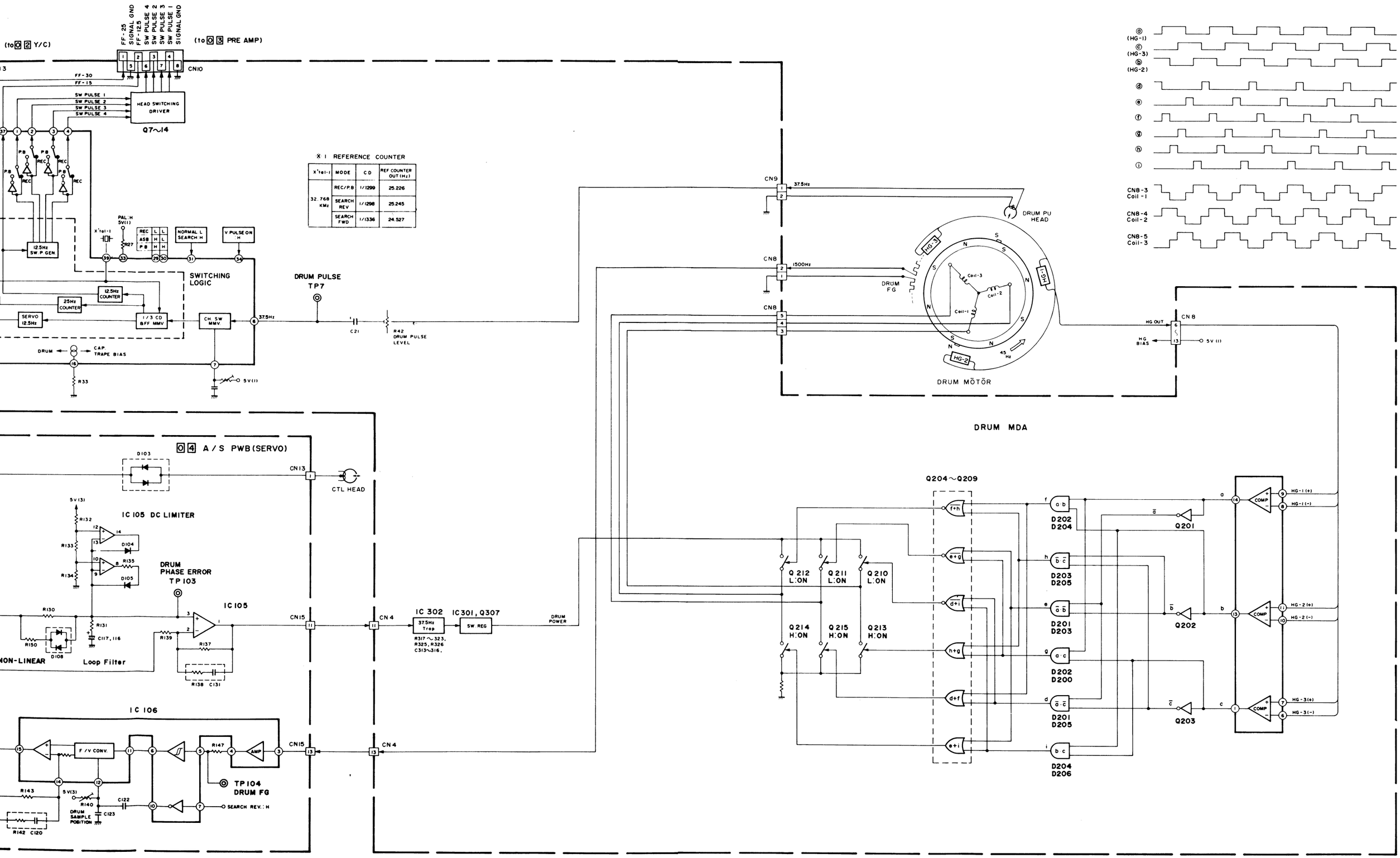
3 SWITCHING LOGIC BLOCK DIAGRAM

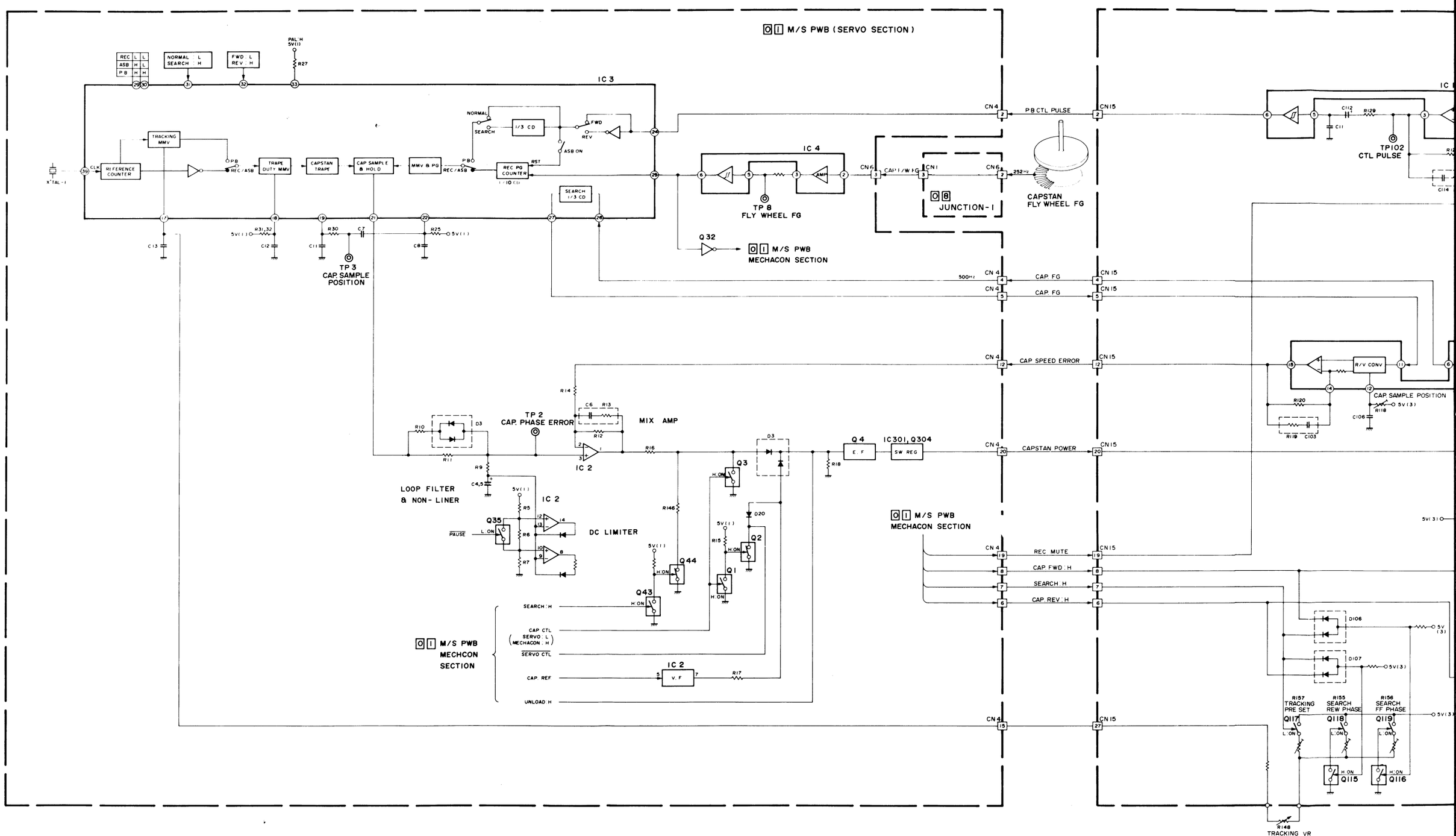



SW PULSE I
SIGNAL GND
(to 03 PRE AMP)
CN10
X1 REFERENCE COUNTER
X'tal-1 | MODE | CD | REF COUNTER OUT (Hz)
32.768 KHz | REC/P.B | 1/1299 | 25.226
SEARCH REV | 1/1298 | 25.245
SEARCH FWD | 1/1336 | 24.527
CN9
37.5Hz
CN8
1500Hz
CN8
NORMAL L SEARCH H
V PULSE ON H
SWITCHING LOGIC
DRUM PULSE TP7
CH. SW MMV.
37.5Hz
C21
R42 DRUM PULSE LEVEL
5V(1)
04 A/S PWB (SERVO)
CN13
CTL HEAD
IMITER
UM
ASE ERROR
TP103
IC105
CN15
CN4
IC302
37.5Hz Trap
IC301, Q307
SW REG
DRUM POWER
R317~323, R325, R326 C313~316,
R137
R138 C131
Q212 L:ON
Q211 L:ON
Q214 H:ON
Q215 H:ON
R147
AMP
CN15
CN4
TP104 DRUM FG
SEARCH REV.:H

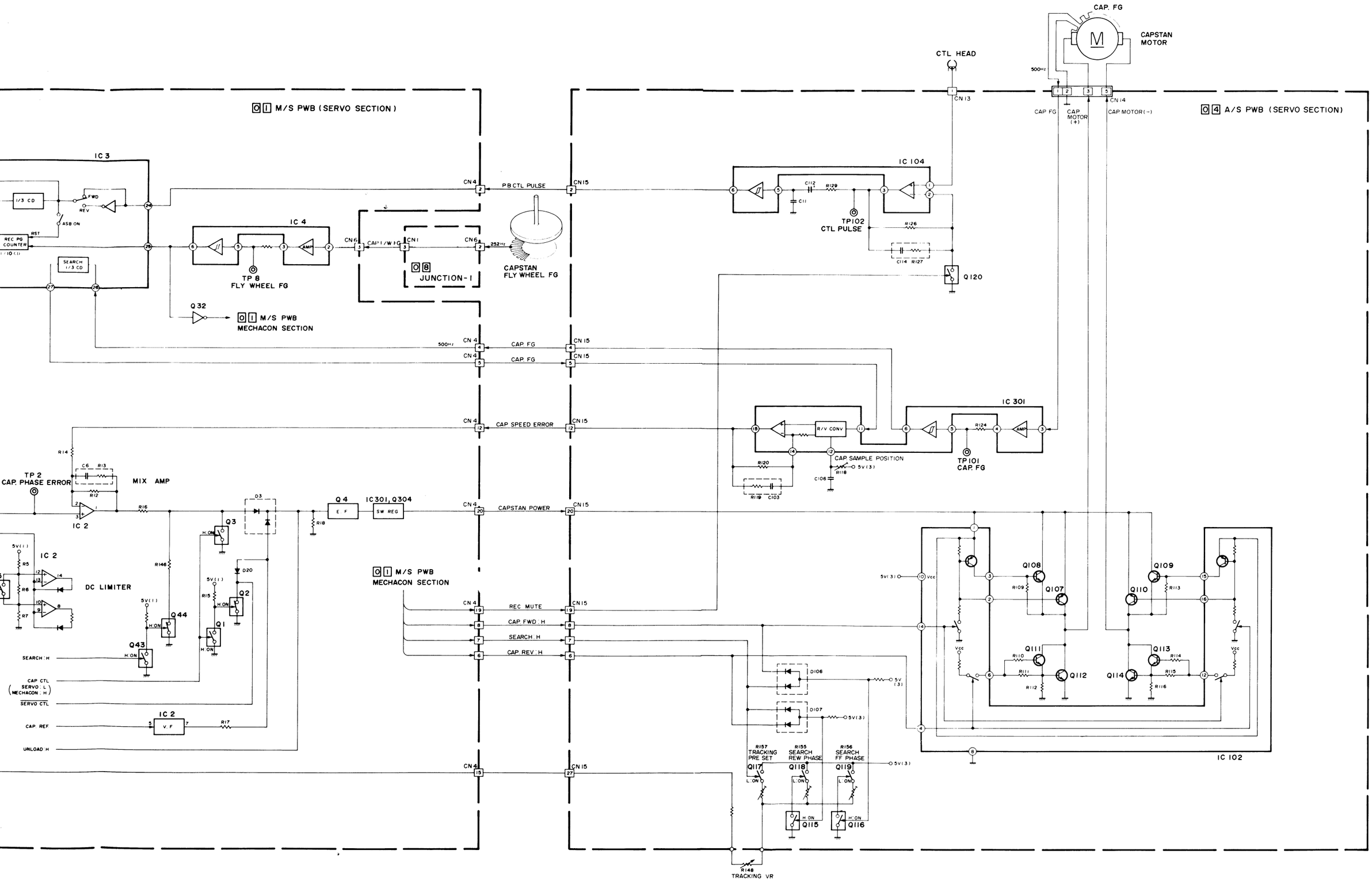

V.PULSE ON
FF-25 (to 02 Y/C)
(to 03 PRE AMP)
FF-25
SIGNAL GND
FF-12.5
SW PULSE 4
SW PULSE 2
SW PULSE 3
SW PULSE 1
SIGNAL GND
CN2
CN3
CN10
FF-30
FF-15
SW PULSE 1
SW PULSE 2
SW PULSE 3
SW PULSE 4
HEAD SWITCHING DRIVER
Q7~14
5V(1)
IC 3
Vcc
X1
1/2 CD
ASB ON
RST
REFERENCE COUNTER
CLK
PB
REC
V. PULSE WIDTH MMV.
V. PULSE DELAY MMV.
12.5Hz SW.P.GEN.
PAL:H 5V(1)
X'tal-1
R27
REC L L
ASB H L
P.B H H
NORMAL L SEARCH H
V PULSE ON H
SWITCHING LOGIC
V. PULSE ON
12.5Hz COUNTER
25Hz COUNTER
SERVO 12.5Hz
1/3 CD 8FF MMV
CH. SW MMV.
37.5Hz
DRUM PULSE TP7
C21
R42 DRUM PULSE LEVEL
CN2
SYNC
6
L.P.F
C1,2
R4
C3
REC PHASE MMV.
REC
P.B
1/2 CD
1/2 CD
CTL DUTY MMV.
REC ON
DRUM Sample & Hold
DRUM TRAPEZOIDE
DRUM
CAP. TRAPE BIAS
R33
C17
5V(1)
R35 REC SW POINT
C14
C15
R36
TP5 DRUM SAMPLING POSITION
TP6 DRUM PHASE ERROR
01 M/S PWB (SERVO)
04 A/S PWB(SERVO)
CN4
CN15
CN13
CTL HEAD
D103
IC 105 DC LIMITER
R132
R133
R134
D104
D105
R135
DRUM PHASE ERROR TP 103
IC 105
CN14
R130
R131
C117, 116
R150
D108
NON-LINEAR
Loop Filter
R139
R137
R138 C131
IC 106
F/V CONV.
AMP
R147
TP 104 DRUM FG
SEARCH REV.: H
R143
R140
DRUM SAMPLE POSITION
C122
C123
R142 C120
IC 302
375Hz Trap
R317~323, R325, R326 C313~316,
IC301, Q307
SW REG
DRUM POWER
X1 REFERENCE COUNTER
X'tal-1
MODE
CD
REF COUNTER OUT (Hz)
32.768 KHz
REC/P.B
1/1299
25.226
SEARCH REV.
1/1298
25.245
SEARCH FWD
1/1336
24.527
CN9
37.5Hz
CN8
1500Hz
Q212 L:ON
Q211 L:ON
Q214 H:ON
Q215 H:ON

Kopftrommelservo Blockschaltbild
Drum servo block diagram



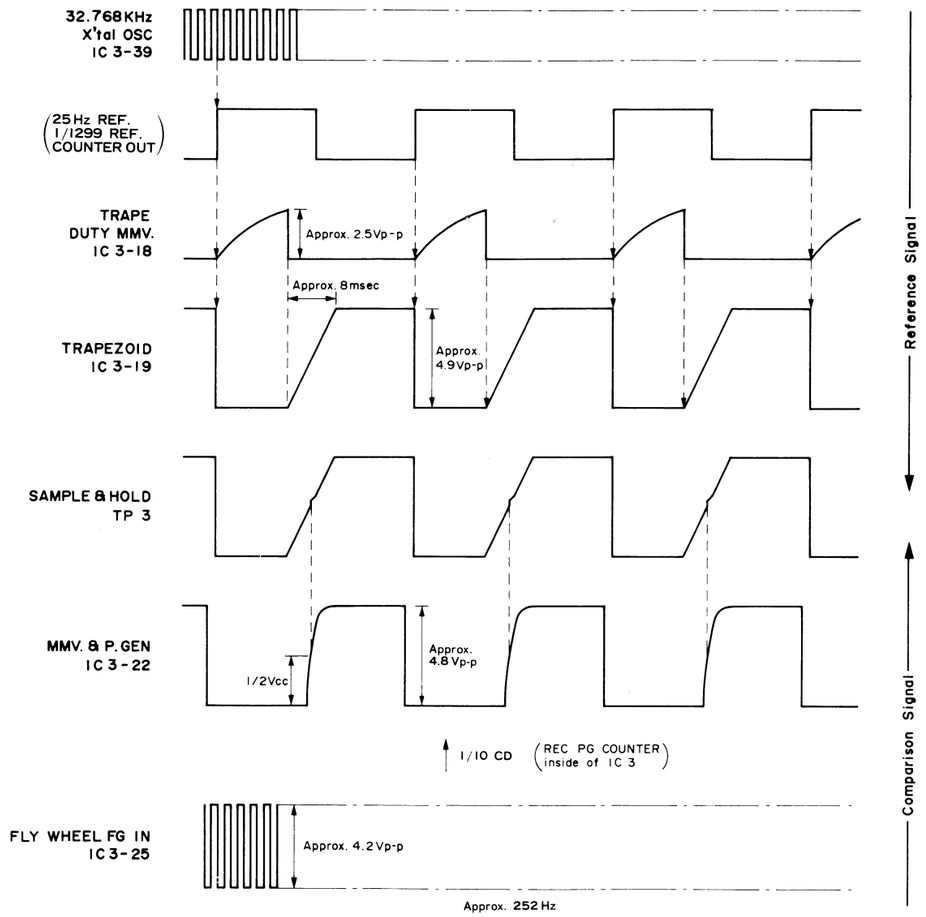

01 M/S PWB (SERVO SECTION)
IC 3
REC
ASB
P.B
NORMAL : L
SEARCH : H
FWD : L
REV : H
PAUSE 5V(1)
R27
TRACKING MMV
REFERENCE COUNTER
X'TAL-1
CLK
PB
REC/ASB
TRAPE DUTY MMV
CAPSTAN TRAPE
CAP SAMPLE & HOLD
MMV & PG
REC PG COUNTER
RST
NORMAL
SEARCH
1/3 CD
FWD
REV
ASB ON
SEARCH 1/3 CD
C13
R31,32
C12
R30
C7
C11
R25
C8
TP 3
CAP. SAMPLE POSITION
IC 4
AMP
TP 8
FLY WHEEL FG
Q32
01 M/S PWB
MECHACON SECTION
CN4
CN15
CN6
CN1
CAPSTAN FG
252Hz
08
JUNCTION-1
PB CTL PULSE
CAPSTAN
FLY WHEEL FG
500Hz
CAP. FG
CAP. SPEED ERROR
CAP. POWER
REC MUTE
CAP. FWD : H
SEARCH : H
CAP. REV : H
R14
C6
R13
R12
TP 2
CAP. PHASE ERROR
MIX AMP
IC 2
R10
D3
R11
R9
C4,5
LOOP FILTER
& NON-LINER
R16
R146
Q3
H.ON
D3
Q4
E.F
IC301, Q304
SW REG
R18
D20
Q2
Q1
Q44
Q43
R5
R6
R7
Q35
PAUSE
L.ON
DC LIMITER
SEARCH : H
CAP. CTL
SERVO : L
(MECHACON : H)
SERVO CTL
CAP. REF
UNLOAD : H
V.F
R17
01 M/S PWB
MECHCON
SECTION
C112
R129
C11
TP102
CTL PULSE
C114
R/V CONV
CAP. SAMPLE POSITION
R120
R118
C106
R119
C103
5V(3)
D106
D107
R157
TRACKING
PRE SET
R155
SEARCH
REW PHASE
R156
SEARCH
FF PHASE
Q117
Q118
Q119
Q115
Q116
R148
TRACKING VR

Capstanservo Blockschaltbild
Capstan servo block diagram

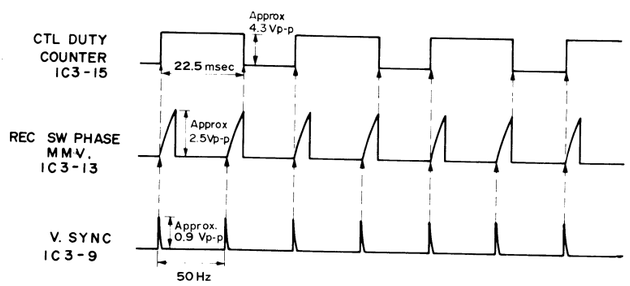


Capstanservo Impulsdiagramm
Capstan servo timing chart

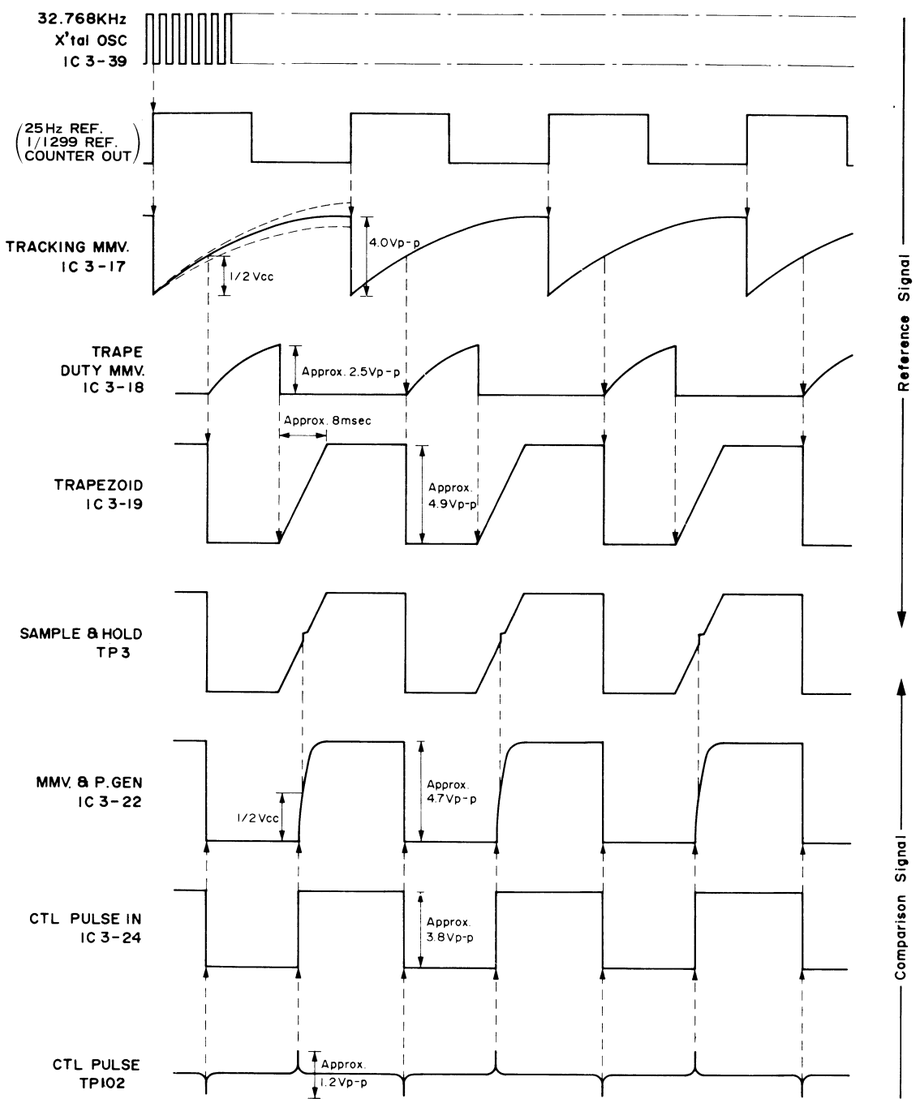
Aufnahme
REC mode



REC CTL PULSE



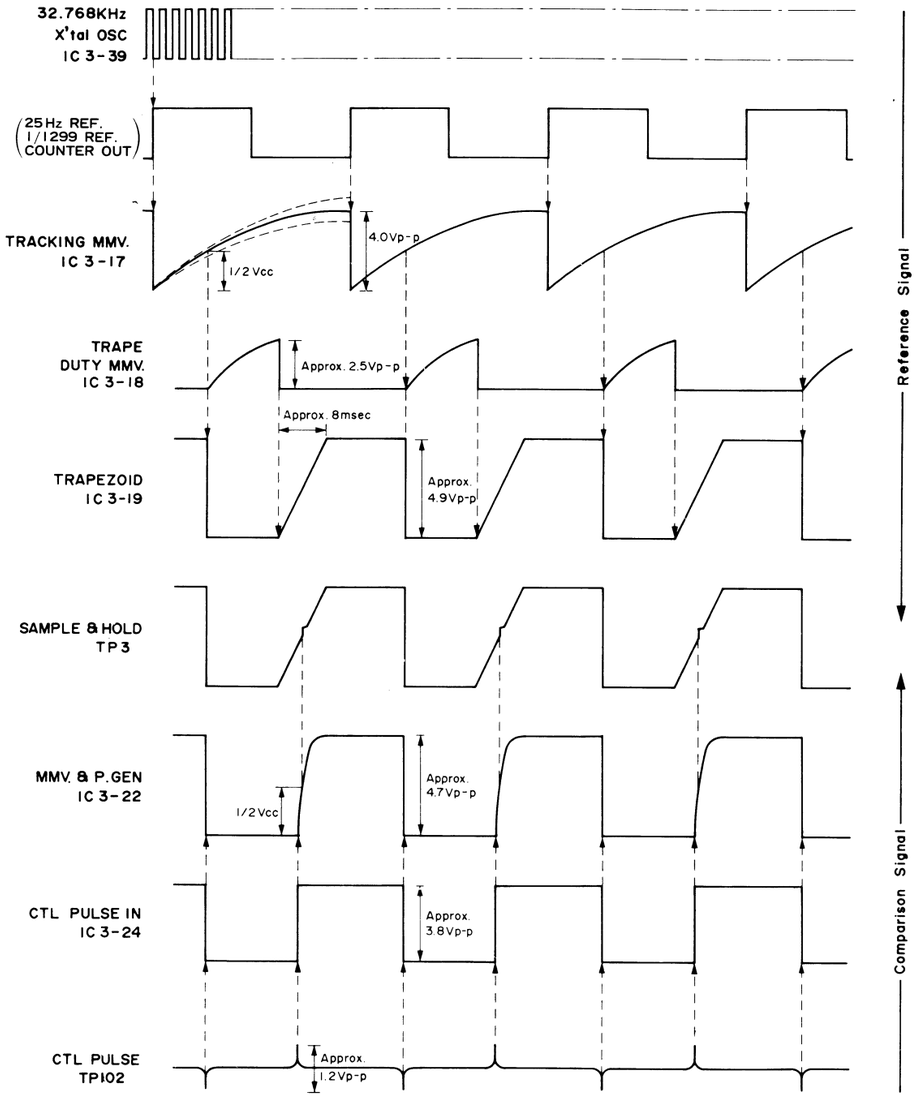
Wiedergabe
P.B. mode



Reference Signal

Comparison Signal

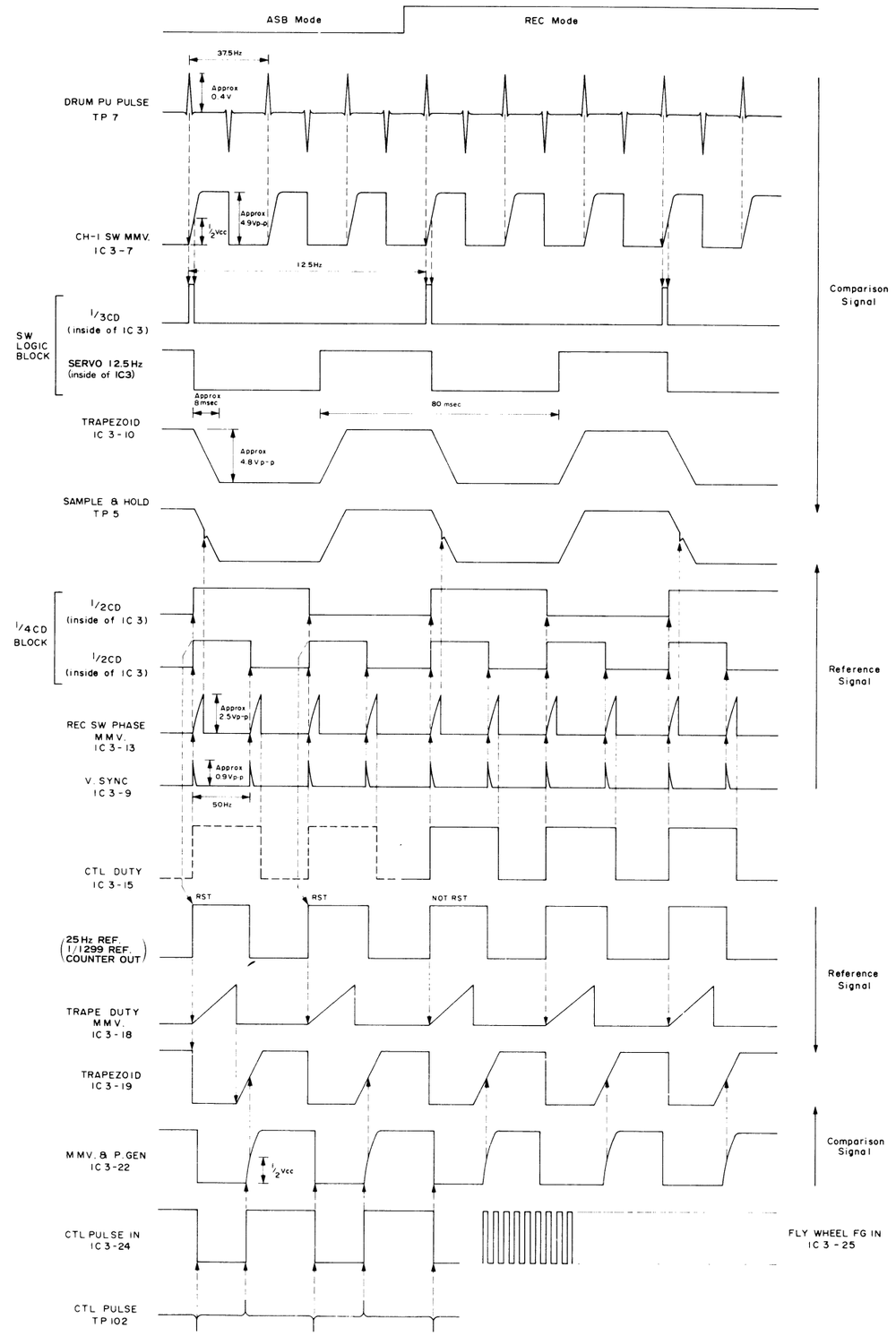
Wiedergabe
P.B. mode



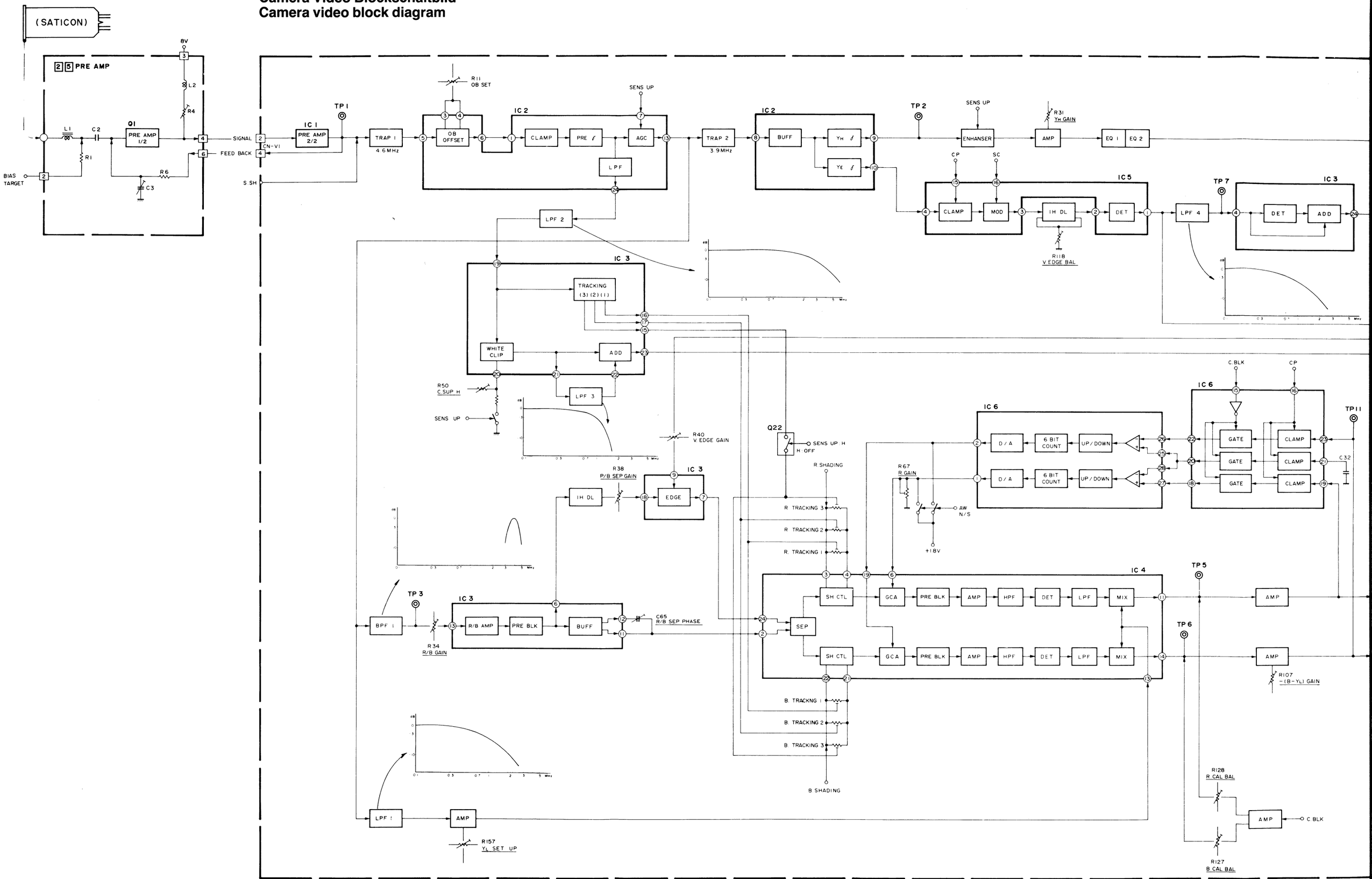
Reference Signal

Comparison Signal

Assemble-Schnitt
Assembly mode



Camera Video Blockschaltbild
Camera video block diagram



SENS UP

IC 2

CLAMP | PRE ∫ | AGC | LPF

LPF 2

TRAP 2
3.9MHz

IC 2

BUFF | YH ∫ | YE ∫

TP 2

SENS UP

ENHANSER

R31
YH GAIN

AMP

EQ 1 | EQ 2

CP | SC

IC 5

CLAMP | MOD | 1H DL | DET

R118
V EDGE BAL

TP 7

IC 3

LPF 4 | DET | ADD

CP

IC 5

CLAMP | BLK W/C | BASE CLIP | MIX

C SYNC

BUFF

TP 8

CN-V3 3 Y OUT

CRT IN

R129
YH SET UP

AMP

C BLK

IC 3

TRACKING
(3)(2)(1)

ADD

LPF 3

R40
V EDGE GAIN

IC 3

R38
P/B SEP GAIN

1H DL | EDGE

PRE BLK | BUFF

C65
R/B SEP PHASE

Q22

SENS UP : H
H OFF

R SHADING

R. TRACKING 3

R. TRACKING 2

R. TRACKING 1

R67
R GAIN

AW
N/S

+18V

IC 6

D/A | 6 BIT COUNT | UP/DOWN

D/A | 6 BIT COUNT | UP/DOWN

IC 6

C BLK | CP

GATE | CLAMP

GATE | CLAMP

GATE | CLAMP

TP11

C32

IC 4

SH CTL | GCA | PRE BLK | AMP | HPF | DET | LPF | MIX

SEP

SH CTL | GCA | PRE BLK | AMP | HPF | DET | LPF | MIX

B. TRACKNG 1

B. TRACKING 2

B. TRACKING 3

B SHADING

TP 5

TP 6

AMP

AMP

R107
-(B-YL) GAIN

R128
R CAL BAL

AMP

C BLK

R127
B CAL BAL

IC 4

CP | SC 90°

CLAMP | MOD

CLAMP | MOD

MIX | C SUP

CP | SC 180°

R115
C GAIN

IC 5

SC 180° | SC 90°

R150
SC PHASE

AMP

BF

R146
SC GAIN

BURST GATE

BASE CLIP | BLK | BURST MIX

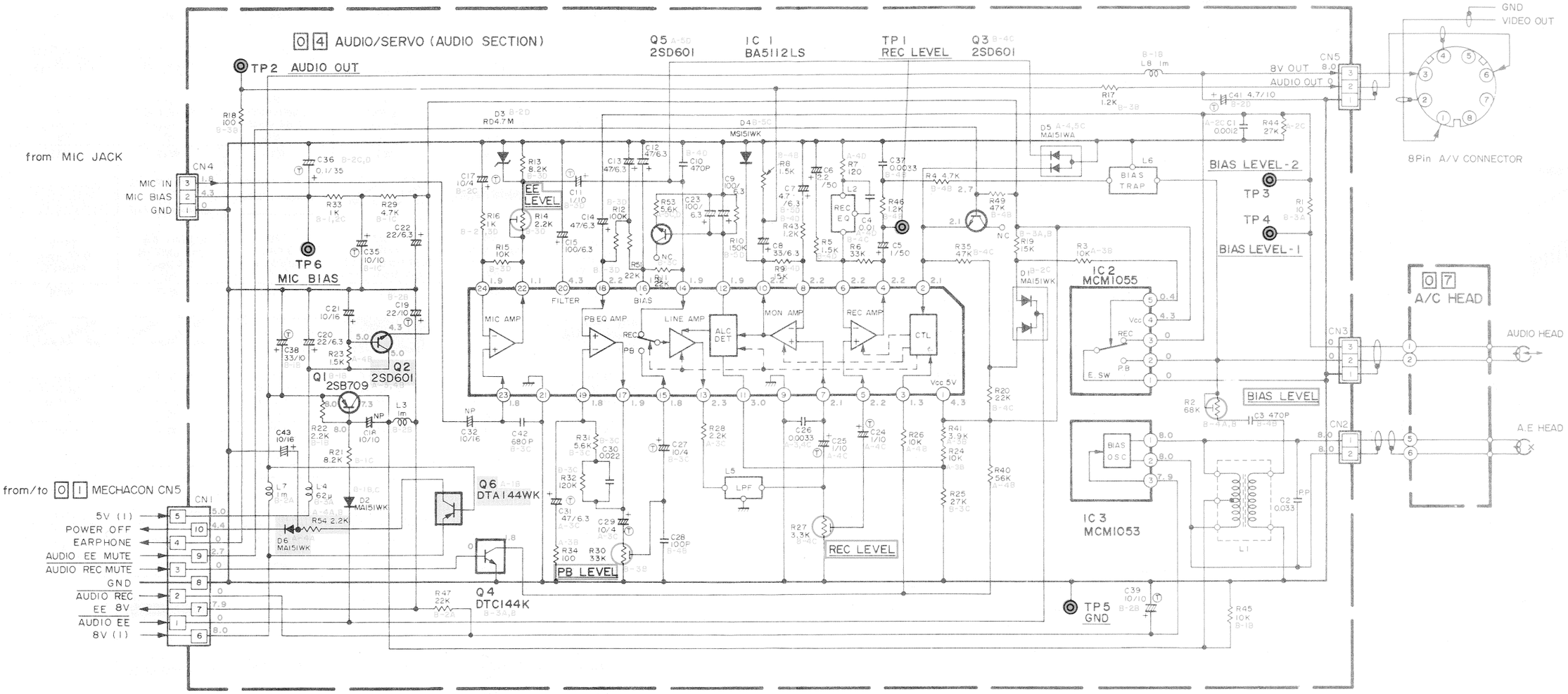
C BLK

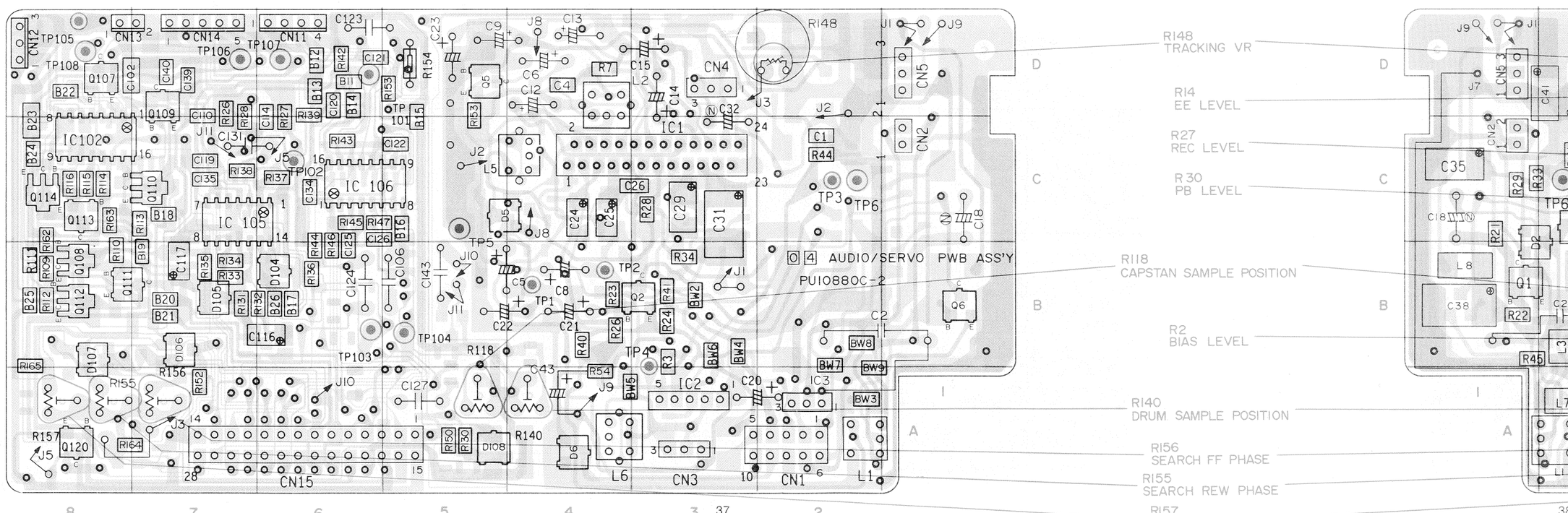
BPF2

BUFF

TP 9

CN-V3 1 CHROMA



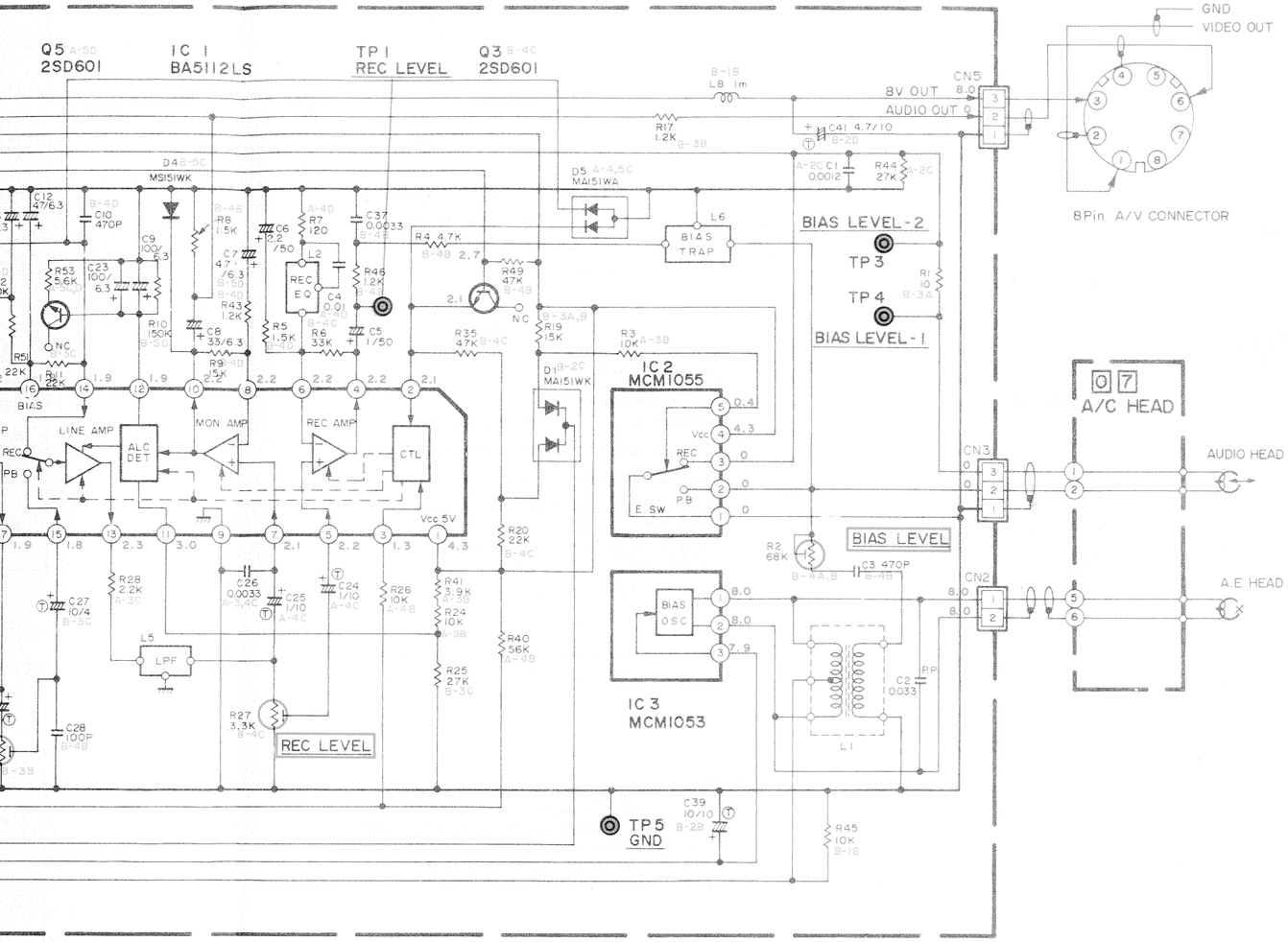


IC1 CTL MODE	REC
IC1 pin ② REC/PB CTL	L
IC1 pin ③ MUTE CTL	L
MIC AMP	ON
PB EQ AMP	ON
REC/PB SW	REC
MON AMP	ON
REC AMP	ON
LINE AMP	ON

NOTES: Unless
1. All resista
2. All induct
3. All capaci
: Chip
: Elect
: Tant
4. Shaded (
specified
5. The digita
Both PNP
6. DC voltages a
stop mode wi

Hinweis:
1. Alle Gleichspann
ohne Signal ge
2. Bauteile in den
Nur gegen Origi

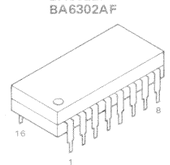
Audio-Schaltbild
Audio circuit diagram



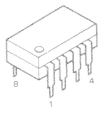
IC1 CTL MODE

	REC	EE/REC MUTE	PB	PB MUTE
IC1 pin ② REC/PB CTL	L	L	H	H
IC1 pin ③ MUTE CTL	L	H	L	H
MIC AMP	ON	ON	ON	ON
PB EQ AMP	ON	ON	ON	ON
REC/PB SW	REC	REC	PB	PB
MON AMP	ON	ON	ON	OFF
REC AMP	ON	OFF	OFF	OFF
LINE AMP	ON	ON	OFF	OFF

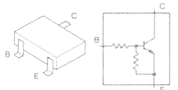
BA6322F
BA6302AF



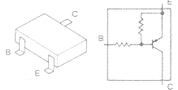
BAF6305



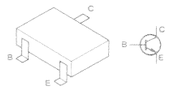
DTC144K



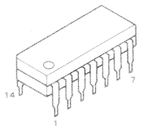
DTA124K



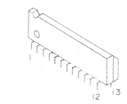
2SD601
2SD1119



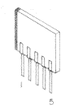
UPC451G



BA5112LS



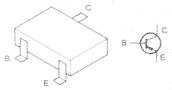
MCM1055



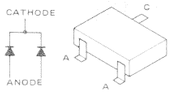
MCM1053

1SS133

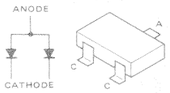
2SB709



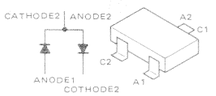
MA151WK



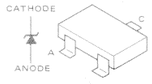
MA151WA



DA204K



RD4.7M
RD8.2MB1
RD9.1MB2



NOTES: Unless otherwise specified.

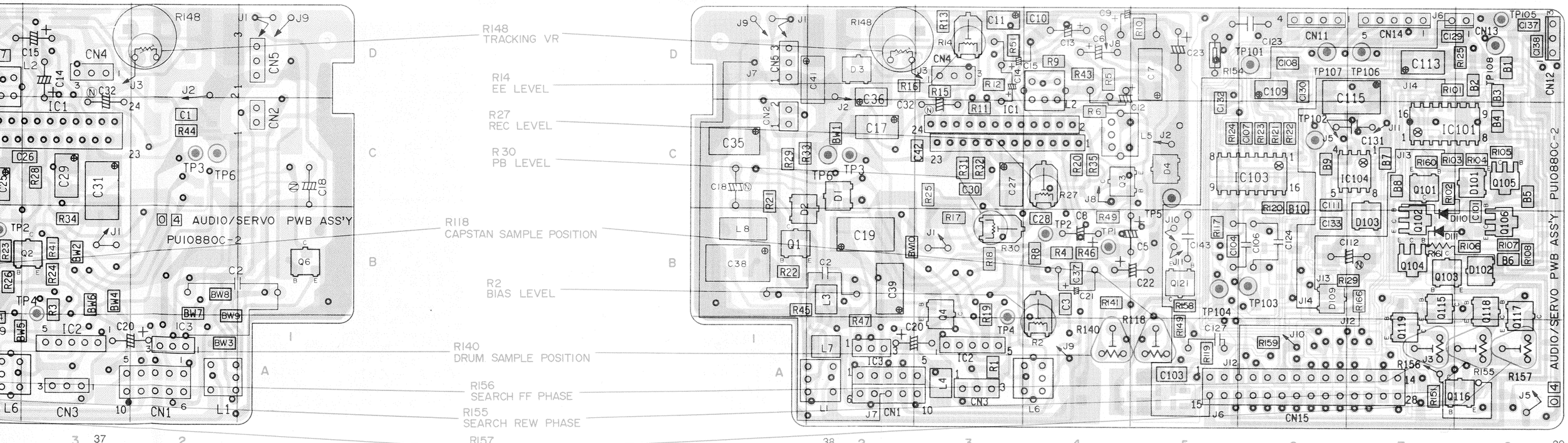
1. All resistance values are in ohms.
2. All inductance values are in H.
3. All capacitance values are in μF.
   - : Chip capacitor
   - MY : Mylar capacitor
   - : Electrolytic capacitor
   - NP : Non-polar capacitor
   - : Tantalum capacitor
   - PP : Polypropylene capacitor
4. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.
5. The digital transistor is a transistor that includes built in resistors. Both PNP and NPN transistors are available.

6. DC voltages are measured with a digital voltmeter during stop mode without a signal.

Hinweis:

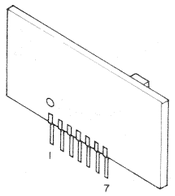
1. Alle Gleichspannungen sind mit einem Digital-Voltmeter im Stop-Betrieb ohne Signal gemessen.
2. Bauteile in den schattierten Flächen sind Sicherheits-Bauteile! Nur gegen Original-Ersatzteile austauschen!

04 Audio (Servo)-Platte
Audio (servo) PWB

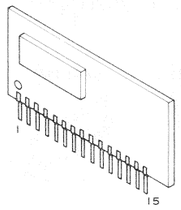


0 2 Video-Platte (Recorder)
Video PWB (tape recorder)

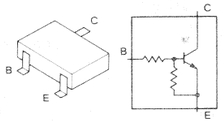
H8D1769



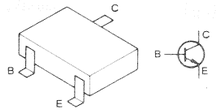
H8D1741



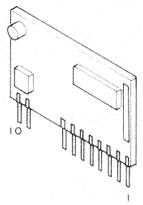
DTC114YK



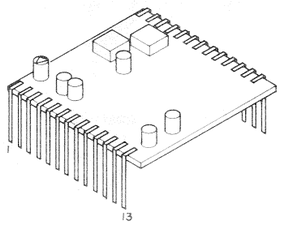
2SC1009



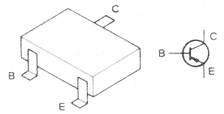
MCM1048B



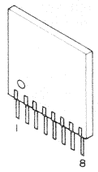
MCM1068A



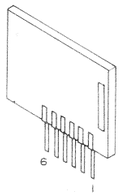
2SB624



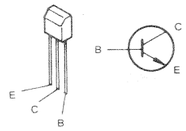
MC5614



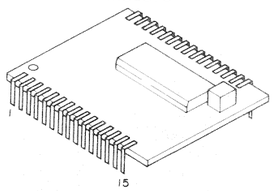
MCM1058P



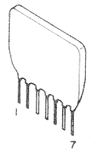
2SC2787LF



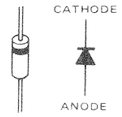
MC5575



MC5365

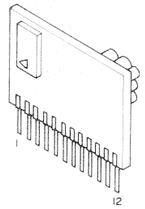


1SS133

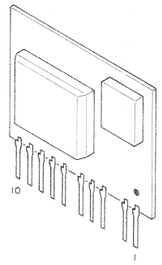


MC5378B

MCM1057



H8D1740



RECORDING SIGNAL PATH
PLAYBACK SIGNAL PATH
REC PLAY SIGNAL PATH

NOTES: Unless otherwise specified.
1. All resistance values are in ohms.
2. All inductance values are in H.
3. All capacitance values are in μF.

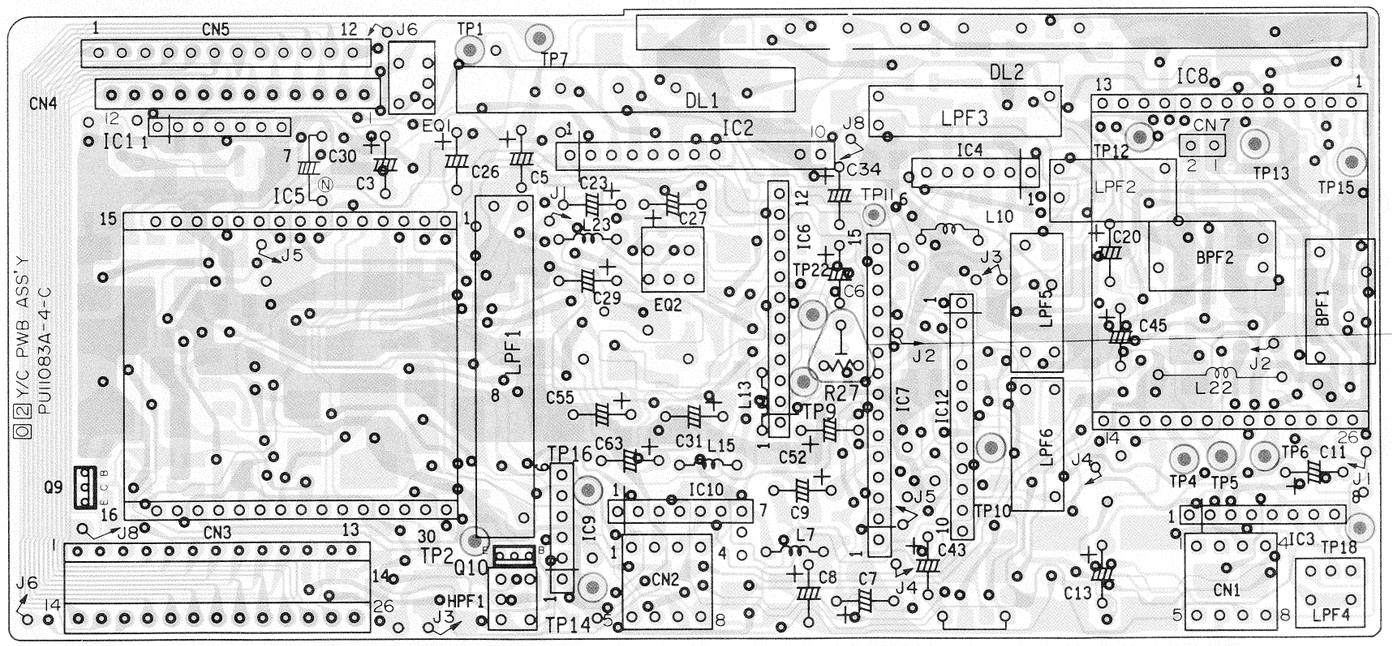
: Chip capacitor
: Electrolytic capacitor
: Non-polar capacitor
: Tantalum capacitor
: Polypropylene capacitor
: Mylar capacitor

4. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.
5. The digital transistor that includes built in resistors. Both PNP and NPN transistors are available.

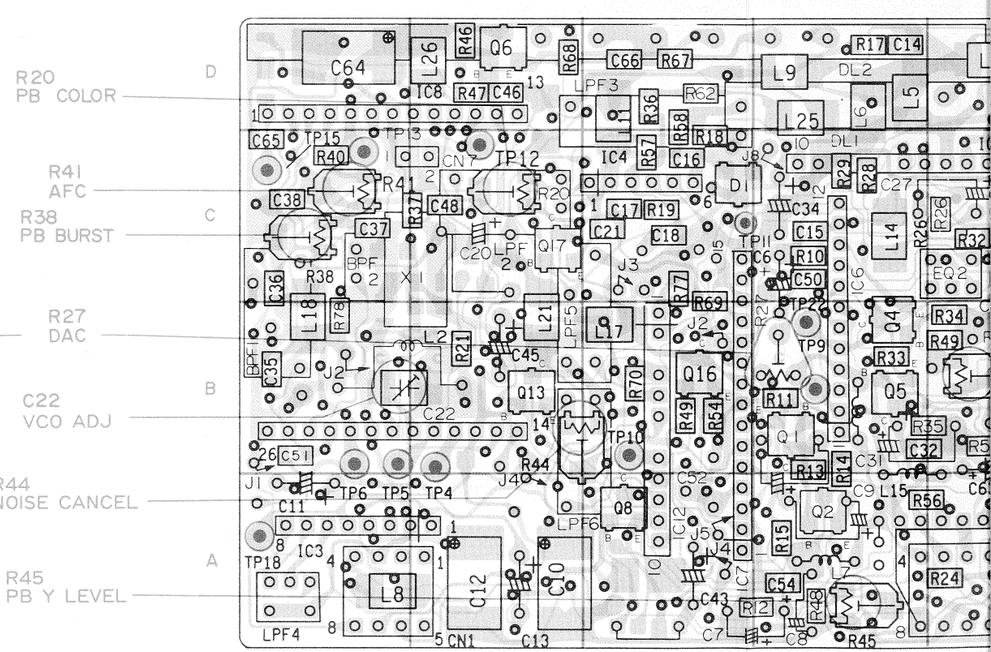
6. DC voltages are measured with a digital voltmeter during recording mode.
7. Where voltage differs between recording and play-back, the voltage during play-back is shown in parentheses.
8. Wave forms
   Recording : Measured by using "Y/C SEPARATOR" with color bar signal input.
   Play-back : Measured during play-back of color bar segment of Aligment Tape.

Hinweis:
1. Alle Gleichspannungen sind mit einem Digital-Voltmeter im Aufnahmebetrieb gemessen.
2. Ergeben sich im Wiedergabe-Betrieb andere Spannungen, so sind diese in Klammern angegeben.
3. Bauteile in den schattierten Flächen sind Sicherheits-bauteile! Nur gegen Original-Ersatzteile wechseln!

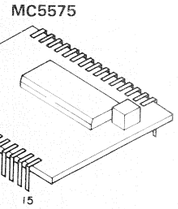
— Front —



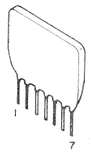
— Rear —



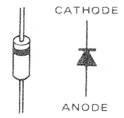
MC5575



MC5365

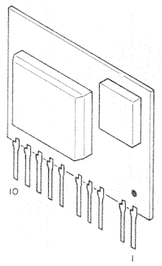


1SS133

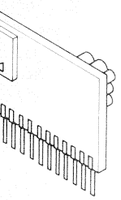


MC5378B

H8D1740



MCM1057



RECORDING SIGNAL PATH
PLAYBACK SIGNAL PATH
REC PLAY SIGNAL PATH

NOTES: Unless otherwise specified.

1. All resistance values are in ohms.
2. All inductance values are in H.
3. All capacitance values are in μF.

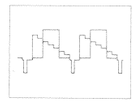
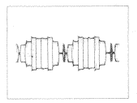
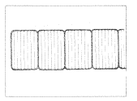
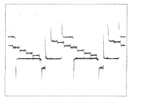
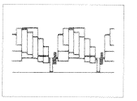
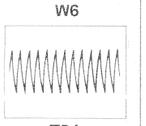
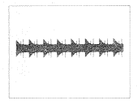
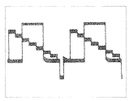
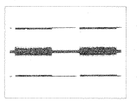
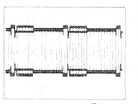
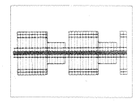
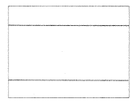
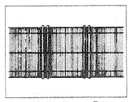
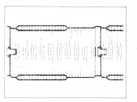
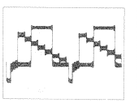
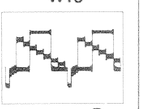
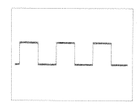
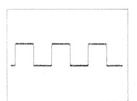
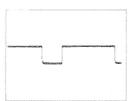
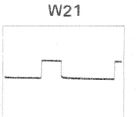
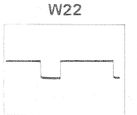
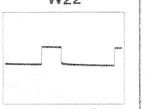
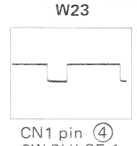
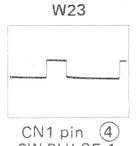
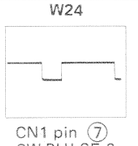
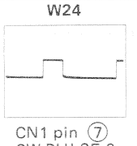
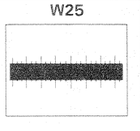
: Chip capacitor
: Electrolytic capacitor
NPI : Non-polar capacitor
: Tantalum capacitor
P.PI : Polypropylene capacitor
MY : Mylar capacitor

4. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.
5. The digital transistor that includes built in resistors. Both PNP and NPN transistors are available.

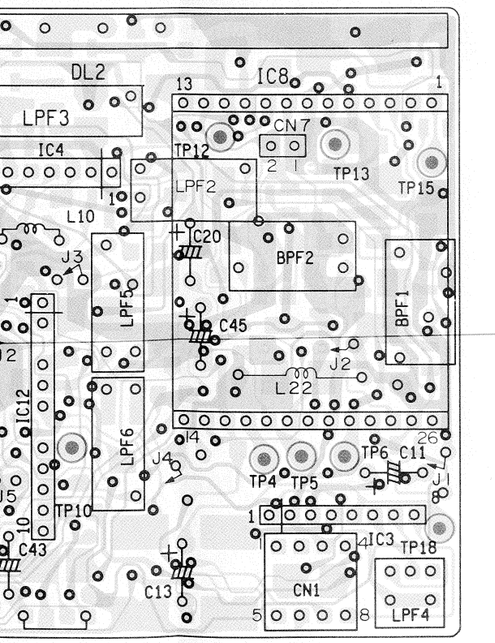
6. DC voltages are measured with a digital voltmeter during recording mode.
7. Where voltage differs between recording and play-back, the voltage during play-back is shown in parentheses.
8. Wave forms
   Recording : Measured by using "Y/C SEPARATOR" with color bar signal input.
   Play-back : Measured during play-back of color bar segment of Aligment Tape.

Hinweis:

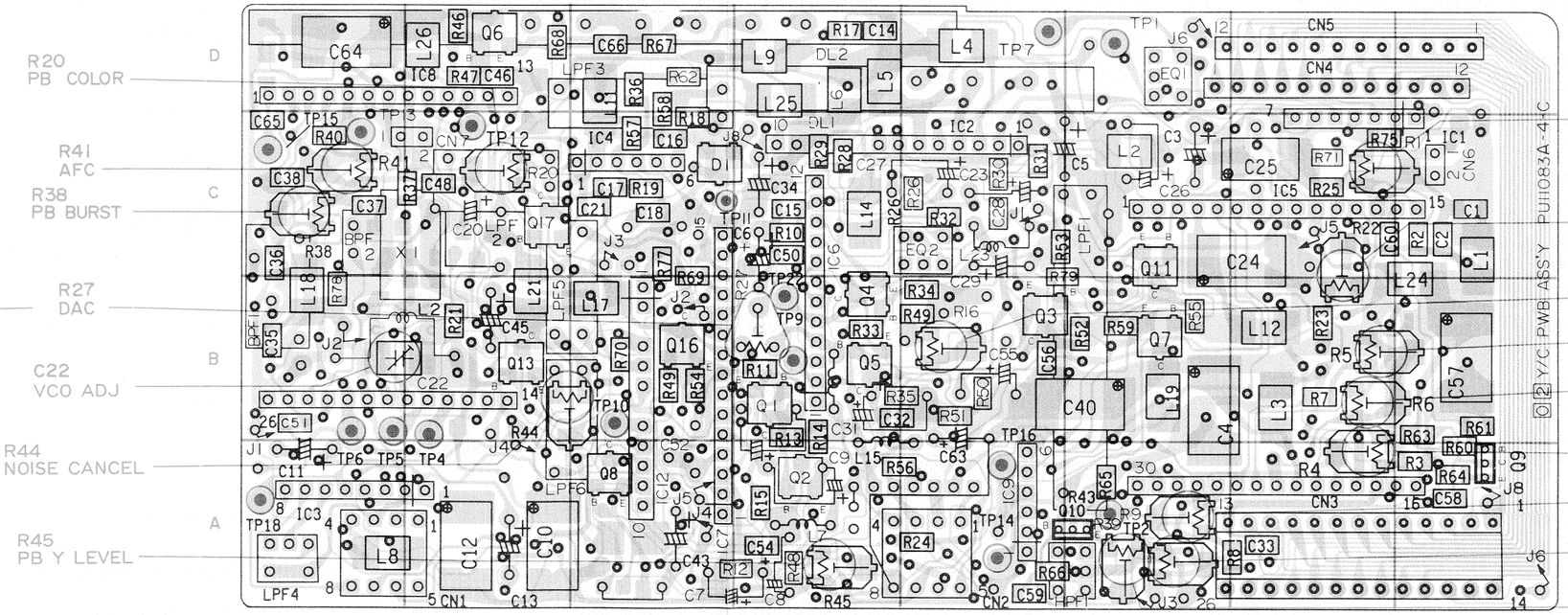
1. Alle Gleichspannungen sind mit einem Digital-Voltmeter im Aufnahmebetrieb gemessen.
2. Ergeben sich im Wiedergabe-Betrieb andere Spannungen, so sind diese in Klammern angegeben.
3. Bauteile in den schattierten Flächen sind Sicherheits-bauteile! Nur gegen Original-Ersatzteile wechseln!

W1	W2	W3	W4	W5	W6
					
CN6 pin ② Y IN 1 Vp-p REC	TP23 CHROMA IN BARST 0.2 Vp-p REC	TP1 PB FM 0.28 Vp-p PB	TP2 EMPHASIS 0.64 Vp-p REC	TP18 VIDEO OUT 2 Vp-p PB	TP4 VCO 0.5 Vp-p PB
W7	**W8**	**W9**	**W10**	**W11**	**W12**
					
TP5 VCO OUT 0.9 Vp-p	TP6 PB COLOR 0.2 Vp-p PB	TP22 Y AMP IN 0.24 Vp-p REC 0.48 Vp-p PB	TP9 DYAC 0.28 Vp-p REC	IC7 pin ⑭ 2nd LMT IN 0.5 Vp-p PB	TP12 0.55 Vp-p PB/REC
W13	**W14**	**W15**	**W16**	**W17**	**W18**
					
TP14 REC COLOR 75 mVp-p REC	TP15 AFC ERROR 2.6 V DC PB	IC5 pin ⑭ FM MOD OUT 0.8 Vp-p REC	TP16 REC FM 3.6 Vp-p REC	IC5 pin ⑥ PB AMP-1 IN 0.36 Vp-p PB	CN 1 pin ⑧ B/W OUT 2 Vp-p PB
W19	**W20**	**W21**	**W21**	**W22**	**W22**
					
CN1 pin ① FF 25 4.0 Vp-p	CN 1 pin ② FF 12.5 3.8 Vp-p	CN 1 pin ⑥ SW PULSE 4 7.3 Vp-p PB	CN1 pin ⑥ SW PULSE 4 7.3 Vp-p REC	CN1 pin ③ SW PULSE 2 7.3 Vp-p PB	CN1 pin ③ SW PULSE 2 7.3 Vp-p REC
W23	**W23**	**W24**	**W24**	**W25**	
					
CN1 pin ④ SW PULSE 1 7.3 Vp-p PB	CN1 pin ④ SW PULSE 1 7.3 Vp-p REC	CN1 pin ⑦ SW PULSE 3 7.3 Vp-p PB	CN1 pin ⑦ SW PULSE 3 7.3 Vp-p REC	TP10 NOISE CANCEL PB	

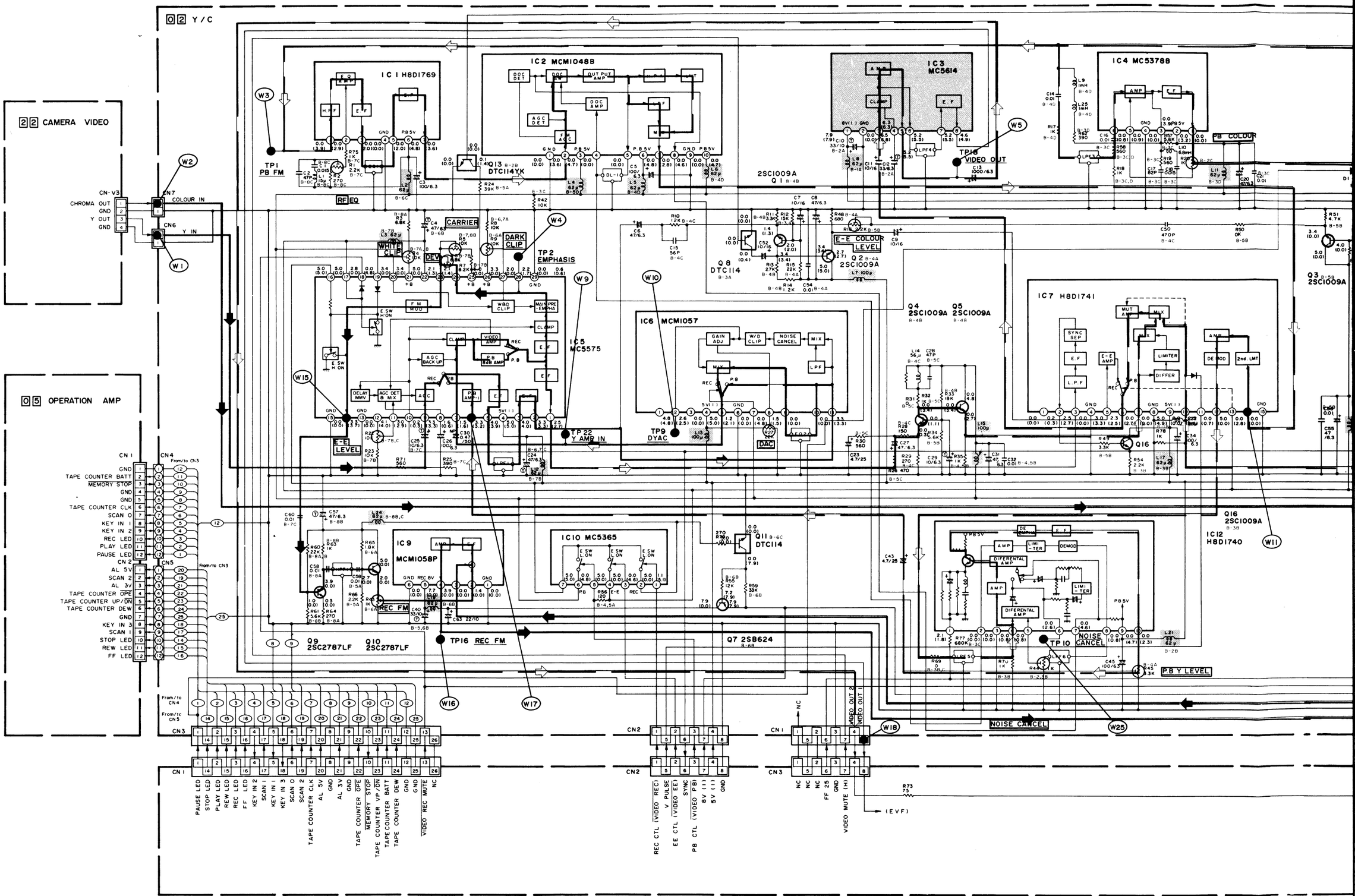
— Front —

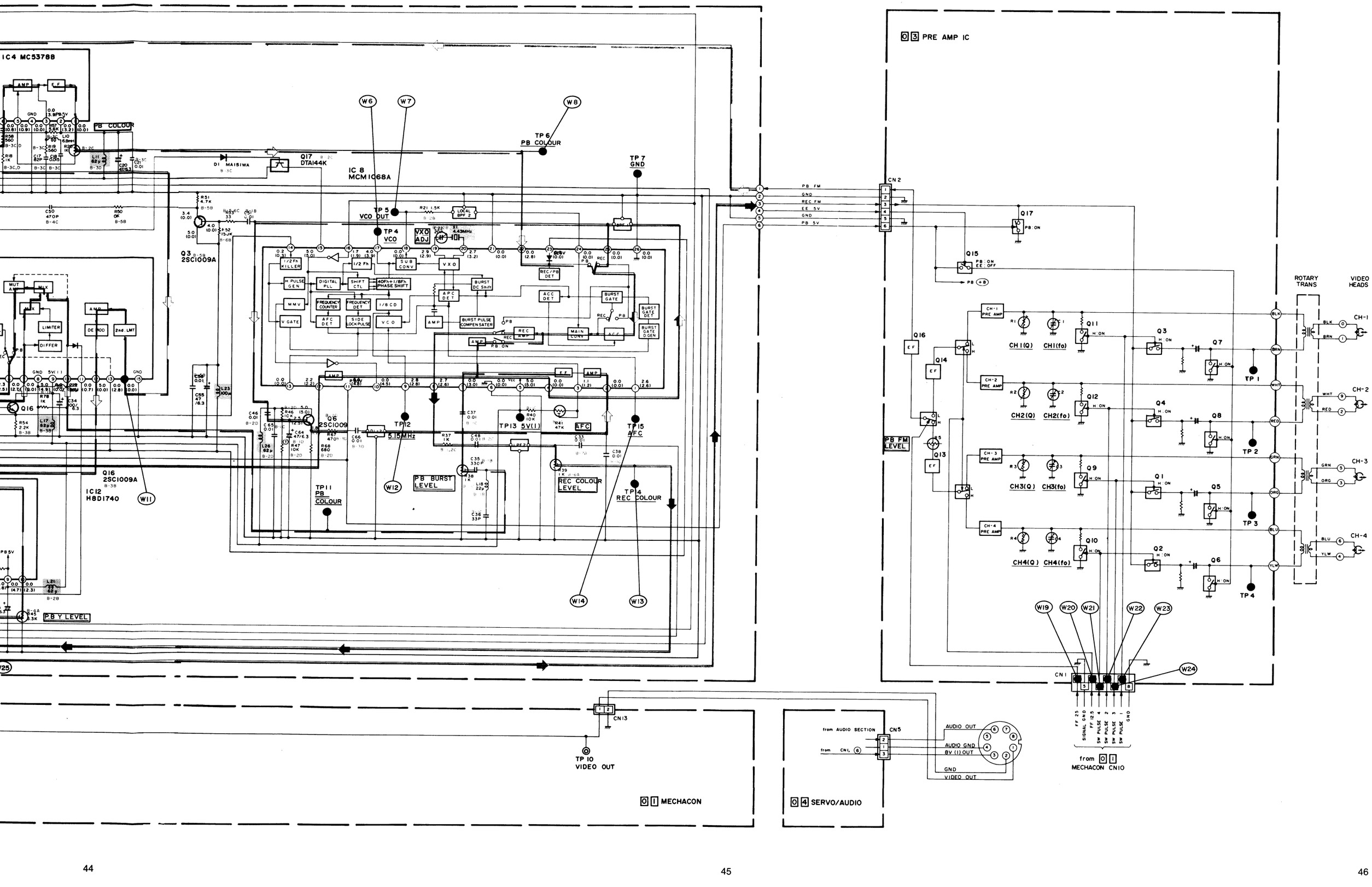


— Rear —

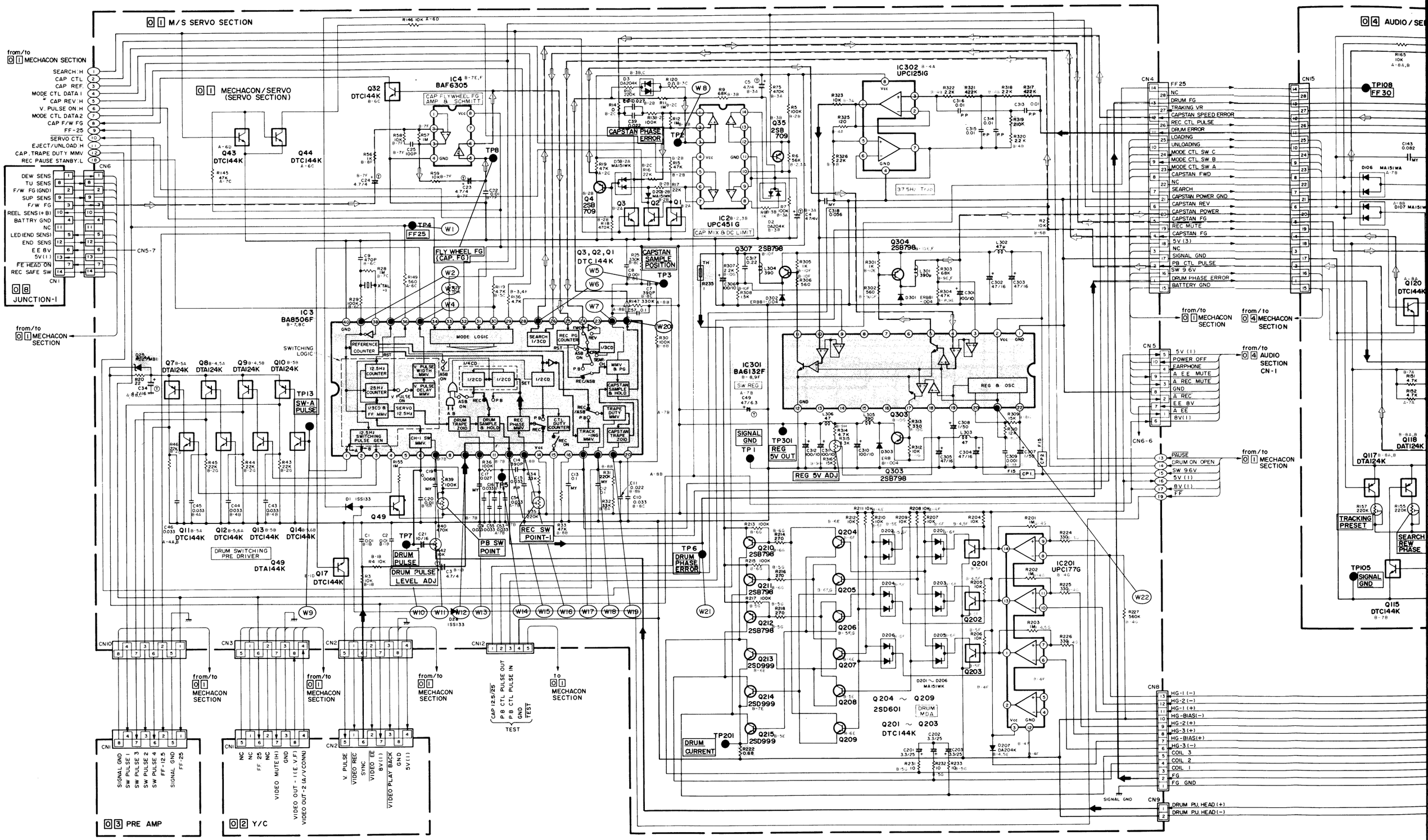


Video-Schaltbild (Recorder)
Video circuit diagram (tape recorder)

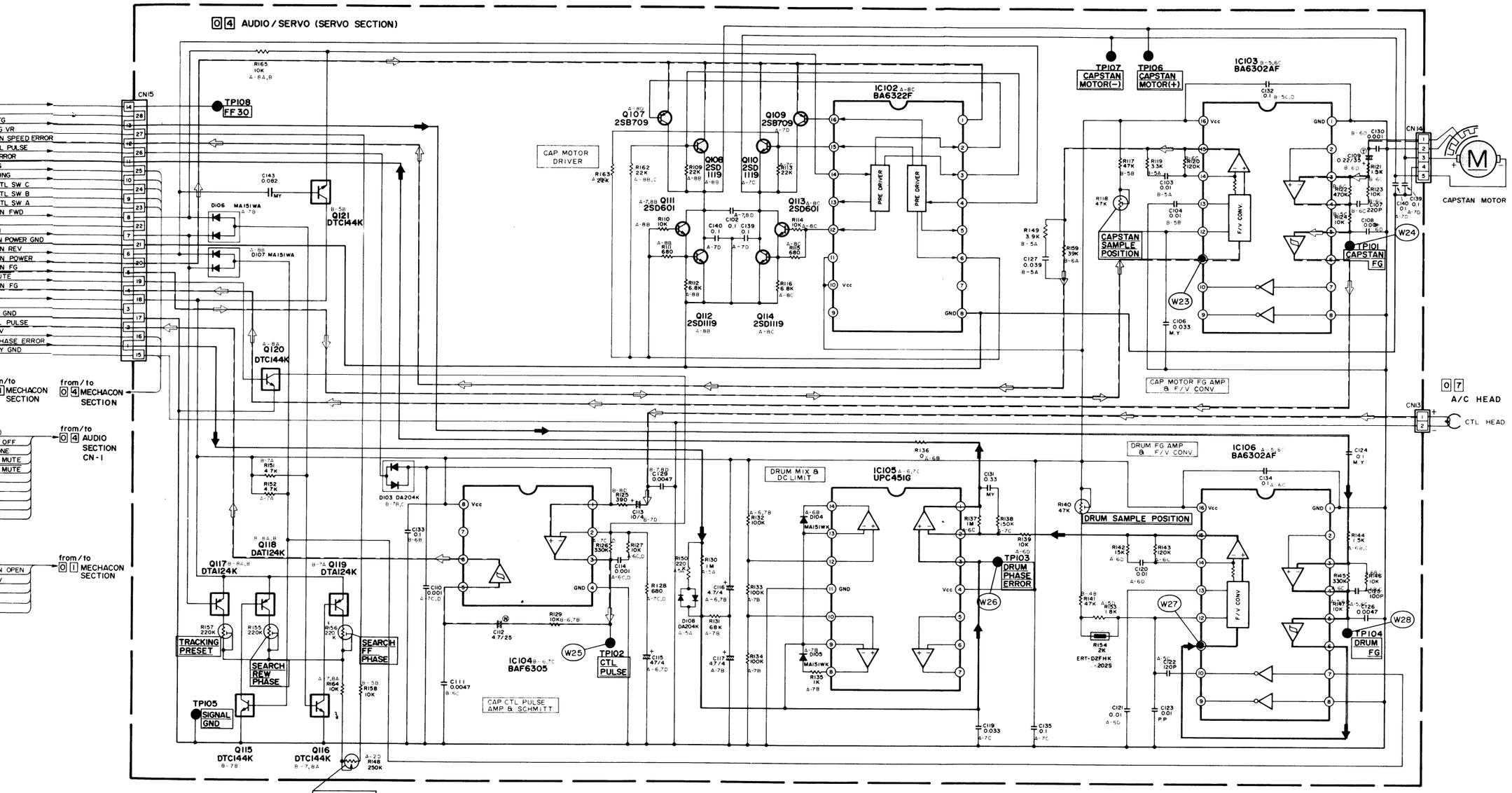


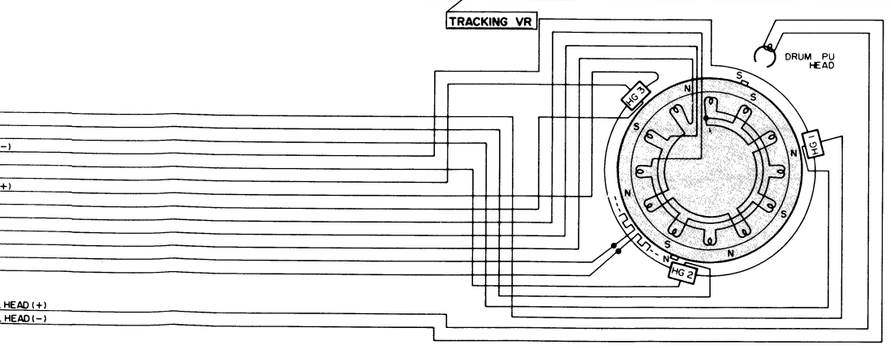

IC4 MC5378B
AMP
C.F.
PB COLOUR
D1 MA151WA
Q17 DTA144K
IC 8 MCM1068A
TP 6 PB COLOUR
TP 7 GND
TP 5 VCO OUT
TP 4 VCO
VXO ADJ
X1 4.43MHz
LOCAL BPF 2
BPF 1
R51 4.7K
R50 0K
C50 470P
Q3 2SC1009A
1/2 Fh KILLER
SUB CONV
VXO
REC/PB DET
H PULSE GEN
DIGITAL PLL
SHIFT CTL
40Fh±1/8Fh PHASE SHIFT
BURST DC Shift
MMV
FREQUENCY COUNTER
FREQUENCY DET
1/8 CD
APC DET
ACC DET
BURST GATE
BURST GATE DET
V GATE
AFC DET
SIDE LOCK PULSE
V C O
AMP
BURST PULSE COMPENSATER
REC AMP
MAIN CONV
ACC
BURST GATE GEN
PB ON
MUTE
MIX
LIMITER
DIFFER
AMP
DE MOD
2nd. LMT
Q16
R54 2.2K
L17 82μ
R78 1K
C34 100/6.3
L21 82μ
P.B Y LEVEL
C55 47/6.3
L23 100μ
C46 0.01
C65 0.01
C64 47/6.3
R47 10K
R68 680
Q15 2SC1009
C66 0.01
5.15MHz
R67 470
R37 1K
C48 0.01
C35 330P
C36 33P
R38 1K
L18 22μ
R40 10K
R41 47K
AFC
C33 0.01
C38 0.01
R39 1K
REC COLOUR LEVEL
TP11 PB COLOUR
TP12
TP13 5V(1)
TP15 AFC
TP14 REC COLOUR
Q16 2SC1009A
IC12 H8D1740
W6
W7
W8
W11
W12
W13
W14
W25
PB FM
GND
REC FM
EE 5V
GND
PB 5V
CN2
03 PRE AMP IC
Q17
PB ON
Q15
PB ON-OFF
Q16
EF
Q14
EF
PB FM LEVEL
R5
Q13
EF
CH-1 PRE AMP
CH1(Q)
CH1(fo)
Q11
H ON
Q3
Q7
CH-2 PRE AMP
CH2(Q)
CH2(fo)
Q12
Q4
Q8
CH-3 PRE AMP
CH3(Q)
CH3(fo)
Q9
Q1
Q5
CH-4 PRE AMP
CH4(Q)
CH4(fo)
Q10
Q2
Q6
ROTARY TRANS
VIDEO HEADS
CH-1
CH-2
CH-3
CH-4
BLK
BRN
WHT
RED
GRN
ORG
BLU
YLW
TP 1
TP 2
TP 3
TP 4
W19
W20
W21
W22
W23
W24
CN1
FF 25
SIGNAL GND
FF 12.5
SW PULSE 4
SW PULSE 2
SW PULSE 3
SW PULSE 1
GND
from 01 MECHACON CN10
CN13
TP 10 VIDEO OUT
01 MECHACON
from AUDIO SECTION
CN5
from CN1, 6
AUDIO OUT
AUDIO GND
8V (1) OUT
GND
VIDEO OUT
04 SERVO/AUDIO

Servo-Regelung Schaltbild
Servo circuit diagram



Servo-Regelung Schaltbild
Servo circuit diagram



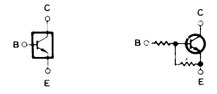


NOTES: Unless otherwise specified.

1. All resistance values are in ohms.
2. All inductance values are in H.
3. All capacitance values are in μF.
   - : Chip capacitor
   - MY : Mylar capacitor
   - : Electrolytic capacitor
   - NP : Non-polar capacitor
   - : Tantalum capacitor
   - PP : Polypropylene capacitor
4. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.
5. The digital transistor is a transistor that includes built in resistors. Both PNP and NPN transistors are available.

DRUM SERVO SIGNAL PATH

CAPSTAN SERVO SIGNAL PATH

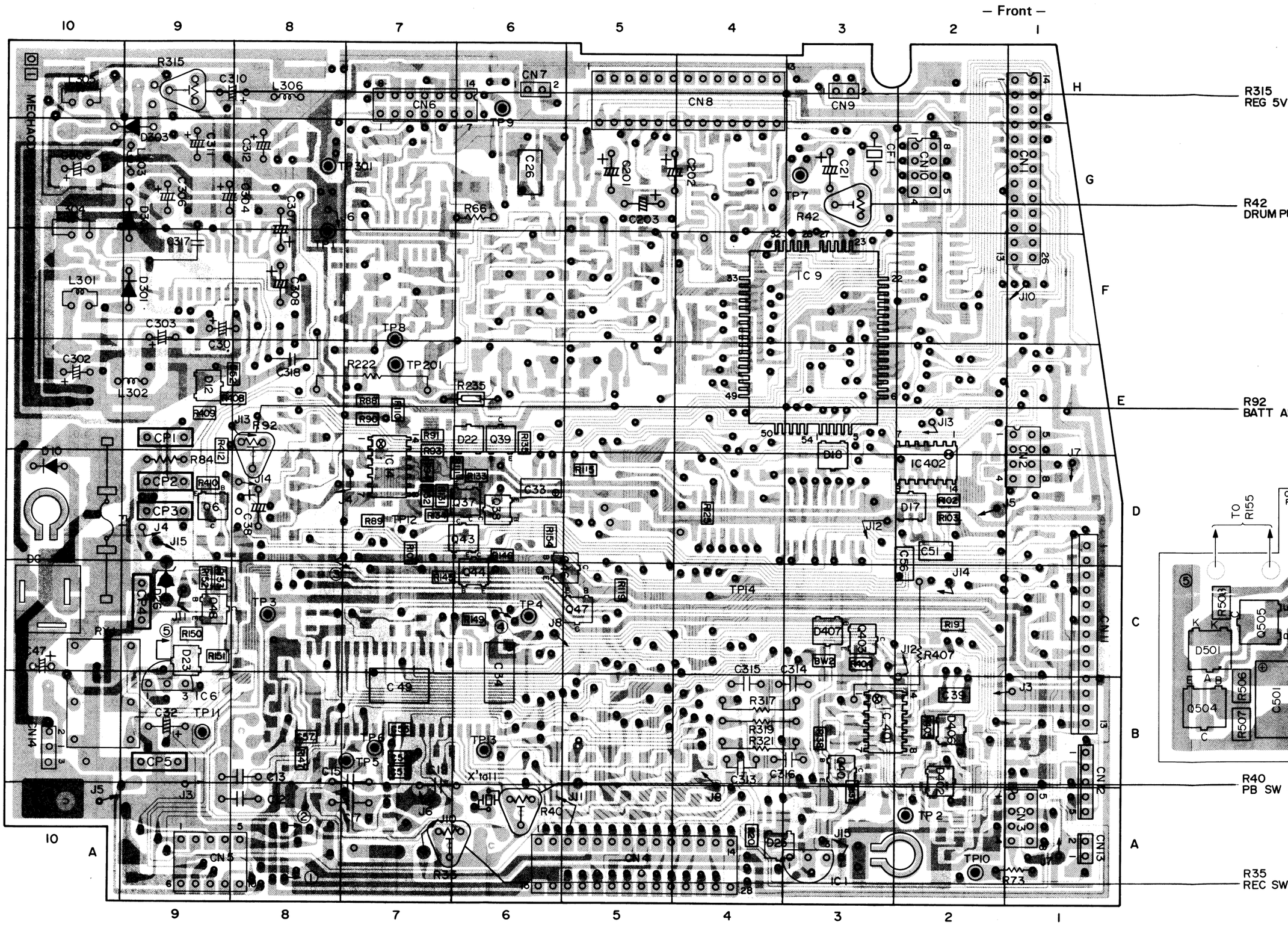


Hinweis:
Bauteile in den schattierten Flächen sind Sicherheitsbauteile!
Nur gegen Original-Ersatzteile auswechseln!

W1	W2
TP4 FF25 25Hz 3.8 Vp-p	IC3 (39) PIN CRYSTAL 1 32.768 kHz 3.3 Vp-p
W5	**W6**
TP3 CAPSTAN SAMPLE POSITION 25 Hz 4.9 Vp-p	IC3 (27) PIN CAPSTAN FG 500 Hz 4.3 Vp-p
W9	**W10**
TP13 SW-A PULSE 12.5 Hz 4.4 Vp-p	TP7 DRUM PULSE 37.5 Hz 0.9 Vp-p
W13	**W14**
IC3-(10) PIN DRUM TRAPE 12.5 Hz 5.0 Vp-p	TP5 DRUM SAMPLE POSITION 12.5 HZ 5.0 Vp-p
W17	**W18**
IC3 17 PIN TRACKING MMV 25 Hz 3.9 Vp-p	IC3 (18) PIN TRAP DUTY MMV 25 Hz 2.5 Vp-p
W21	**W22**
TP6 DRUM PHASE ERROR DC 2.5 V	IC301 (21) PIN SW REG OSC 40 kHz 2.0 Vp-p
W25	**W26**
TP102 CTL PULSE 25 Hz 1.2 Vp-p	TP103 DRUM PHASE ERROR DC 2.5 V

0 1 Platte Servo-Regelung/Mechaniksteuerung
Mechacon/Servo PWB

W3	W4
IC3 (37) PIN FF12.5 12.5 Hz 3.8 Vp-p	IC3 (35) PIN V. PULSE 50 Hz 4.3 Vp-p duty (H) 180 μsec
W7	**W8**
IC3 (22) PIN CAPSTAN MMV & PG 25 Hz 4.9 Vp-p	TP2 CAPSTAN PHASE ERROR DC 2.5 V
W11	**W12**
IC3 (7) PIN CH-1 SW MMV 37.5 Hz 4.9 Vp-p	IC3 (9) PIN V. SYNC 50 Hz 0.9 Vp-p
W15	**W16**
IC3 (12) PIN DRUM PHASE ERROR DC 2.5 V	IC3 (13) PIN REC PHASE MMV 50 Hz 2.5 Vp-p
W19	**W20**
IC3 (19) PIN CAPSTAN TRAPE –ZOID 30 Hz 4.9 Vp-p	IC3 (21) PIN CAPSTAN PHASE ERROR DC 2.5 V
W23	**W24**
IC103 (11) PIN CAPSTAN FG F/V IN 500 Hz 4.3 Vp-p	TP101 CAPSTAN FG SCHMITT IN 500 Hz 2.1 Vp-p
W27	**W28**
IC106 (11) PIN DRUM FG F/V IN 1500 Hz 4.2 Vp-p	TP104 DRUM SCHMITT IN 1500 Hz 1.8 Vp-p



— Rear —

R315
REG 5V ADJ

R42
DRUM PULSE LEVEL ADJ

R92
BATT ALARM

R40
PB SW POINT

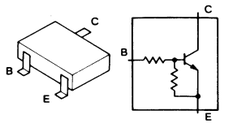
R35
REC SW POINT-1

CURRENT DET. PWB ASSY
PU35449A-C

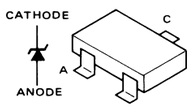
TO R155

MECHACON/SERVO PWB ASSY PU35795-2-C

DTC144K



RD2.7MB1
RD5.6MB1



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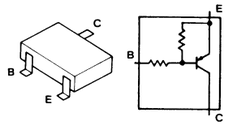

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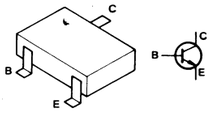

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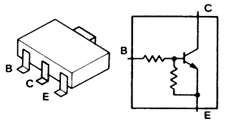

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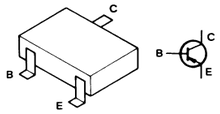

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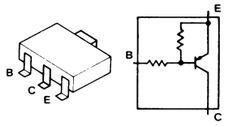

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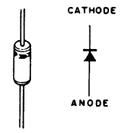

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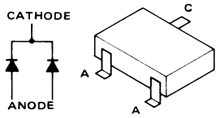

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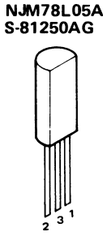

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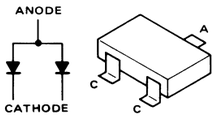

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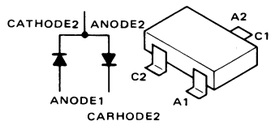
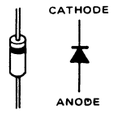
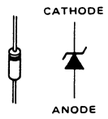


1SS133



RD3.9EB1



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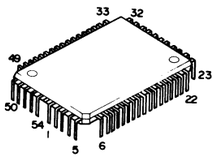
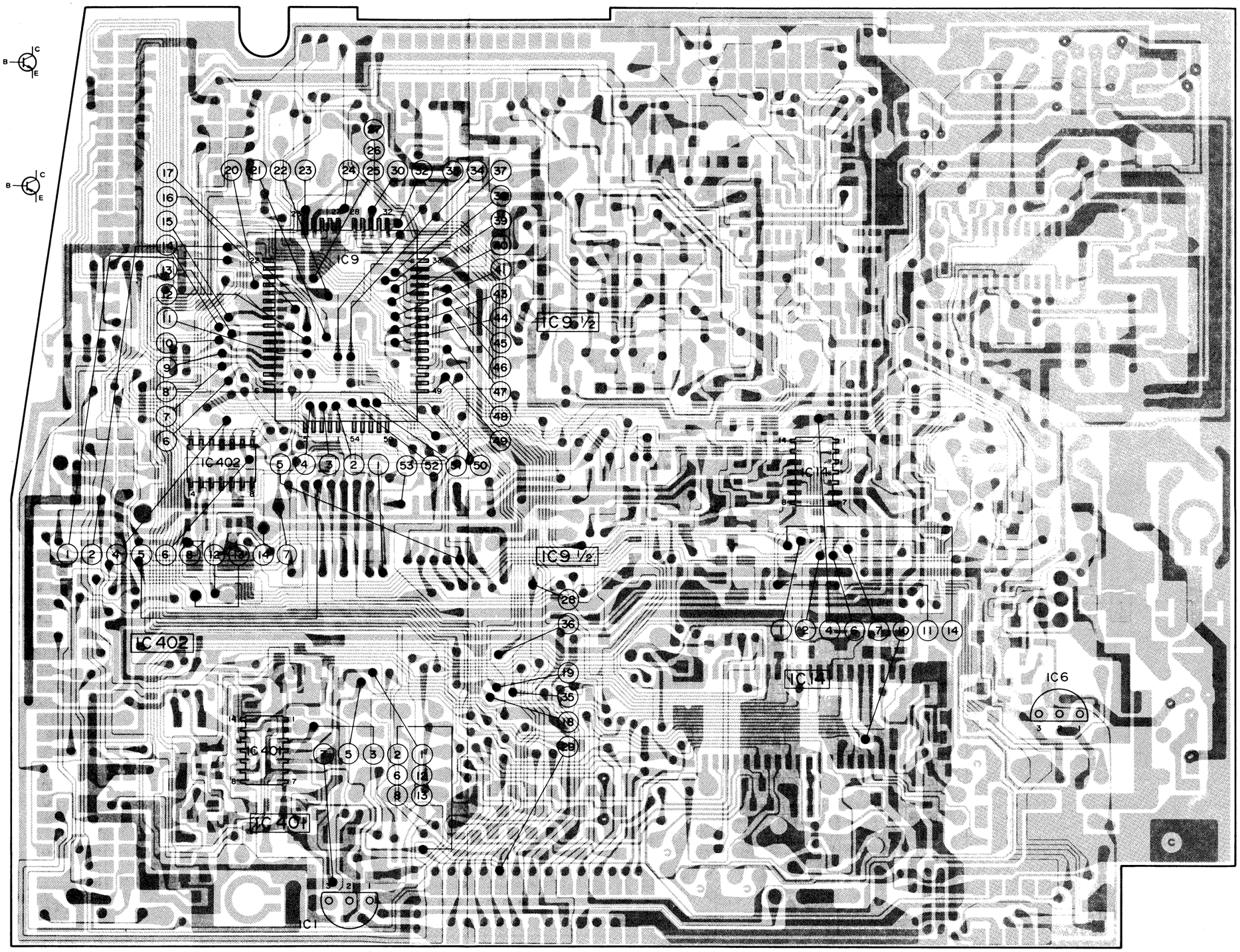


0 1 Platte Servo-Regelung/Mechaniksteuerung (IC-Anschlüsse)
Mechacon/Servo PWB (IC-Pin location)



Spannungstabe

Servoregelung/Me
Servo/Mechacon P

MODE / IC No.	STOP	PLAY
IC2-①	3.7	0.8
②	1.0	2.5
③	3.2	2.7
④	5.0	5.0
⑤	0	1.3
⑥	0	1.3
⑦	0	1.3
⑧	0	0
⑨	3.1	2.4
⑩	1.9	1.9
⑪	0	0
⑫	3.0	3.0
⑬	3.1	2.4
⑭	2.4	3.8
IC4-①	1.4	–
②	1.4	–
③	1.4	–
④	0	–
⑤	2.0	–
⑥	4.2	–
⑦	0	–
⑧	5.0	–
		–
IC201-①	0	–
②	5.0	–
③	5.0	–
④	0.4	–
⑤	4.9	–
⑥	3.6	–
⑦	3.5	–
⑧	2.2	–
⑨	2.2	–
⑩	0.8	–
⑪	0.8	–
⑫	0	–
⑬	0	–
⑭	4.2	–
IC301-①	0	–
②	10.1	–
③	0.7	–
④	0.8	–
⑤	10.2	–
⑥	0	–
⑦	0	–
⑧	0	–
⑨	0	–
⑩	0	–
⑪	10.2	–
⑫	0	–
⑬	0	–
⑭	0	–
⑮	0	–
⑯	0	–
⑰	5.3	–
⑱	3.4	–
⑲	3.5	–
⑳	2.9	–
㉑	3.0	–
㉒	6.9	–

Spannungstabellen · DC voltage tables

Servoregelung/Mechaniksteuerung Platte [0] [1]
Servo/Mechacon PWB [0] [1]

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC2-①	3.7	0.8	0.9	2.2	2.6	3.8	3.8
②	1.0	2.5	2.4	2.7	2.8	1.0	1.0
③	3.2	2.7	2.5	2.7	2.8	2.4	2.7
④	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑤	0	1.3	1.3	2.4	2.4	0	1.3
⑥	0	1.3	1.3	2.4	2.4	0	1.3
⑦	0	1.3	1.3	2.4	2.4	0	1.3
⑧	0	0	0	0	0	0	0
⑨	3.1	2.4	2.4	2.7	2.8	2.3	2.3
⑩	1.9	1.9	1.9	1.9	1.9	2.3	2.3
⑪	0	0	0	0	0	0	0
⑫	3.0	3.0	3.0	3.0	3.0	2.3	2.3
⑬	3.1	2.4	2.4	2.7	2.8	2.3	2.3
⑭	2.4	3.8	3.8	3.8	3.8	1.7	1.7
IC4-①	1.4	–	–	–	–	–	–
②	1.4	–	–	–	–	–	–
③	1.4	–	–	–	–	–	–
④	0	–	–	–	–	–	–
⑤	2.0	–	–	–	–	–	–
⑥	4.2	–	–	–	–	–	–
⑦	0	–	–	–	–	–	–
⑧	5.0	–	–	–	–	–	–
		–	–	–	–	–	–
		–	–	–	–	–	–
IC201-①	0	–	–	–	–	–	–
②	5.0	–	–	–	–	–	–
③	5.0	–	–	–	–	–	–
④	0.4	–	–	–	–	–	–
⑤	4.9	–	–	–	–	–	–
⑥	3.6	–	–	–	–	–	–
⑦	3.5	–	–	–	–	–	–
⑧	2.2	–	–	–	–	–	–
⑨	2.2	–	–	–	–	–	–
⑩	0.8	–	–	–	–	–	–
⑪	0.8	–	–	–	–	–	–
⑫	0	–	–	–	–	–	–
⑬	0	–	–	–	–	–	–
⑭	4.2	–	–	–	–	–	–
		–	–	–	–	–	–
		–	–	–	–	–	–
IC301-①	0	–	–	–	–	–	–
②	10.1	–	–	–	–	–	–
③	0.7	–	–	–	–	–	–
④	0.8	–	–	–	–	–	–
⑤	10.2	–	–	–	–	–	–
⑥	0	–	–	–	–	–	–
⑦	0	–	–	–	–	–	–
⑧	0	–	–	–	–	–	–
⑨	0	–	–	–	–	–	–
⑩	0	–	–	–	–	–	–
⑪	10.2	–	–	–	–	–	–
⑫	0	–	–	–	–	–	–
⑬	0	–	–	–	–	–	–
⑭	0	–	–	–	–	–	–
⑮	0	–	–	–	–	–	–
⑯	0	–	–	–	–	–	–
⑰	5.3	–	–	–	–	–	–
⑱	3.4	–	–	–	–	–	–
⑲	3.5	–	–	–	–	–	–
⑳	2.9	–	–	–	–	–	–
㉑	3.0	–	–	–	–	–	–
㉒	6.9	–	–	–	–	–	–

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC3-①	4.3	–	–	–	–	–	–
②	4.3	–	–	–	–	–	–
③	4.3	–	–	–	–	–	–
④	0	–	–	–	–	–	–
⑤	0	0	0	0	0	0	0
⑥	1.6	–	–	–	–	–	–
⑦	0.1	–	–	–	–	–	–
⑧	4.9	–	–	–	–	–	–
⑨	1.7	–	–	–	–	–	–
⑩	4.9	–	–	–	–	–	–
⑪	4.1	–	–	–	–	–	–
⑫	4.1	–	–	–	–	–	–
⑬	0.1	–	–	–	–	–	–
⑭	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑮	0.8	–	–	–	–	–	–
⑯	2.8	2.7	2.4	2.7	2.7	2.7	2.7
⑰	2.3	–	–	–	–	–	–
⑱	0.6	–	–	–	–	–	–
⑲	2.6	–	–	–	–	–	–
⑳	0.2	–	–	–	–	–	–
㉑	4.3	–	–	–	–	–	–
㉒	4.7	–	–	–	–	–	–
㉓	0	–	–	–	–	–	–
㉔	4.4	–	–	–	–	–	–
㉕	4.2	–	–	–	–	–	–
㉖	4.4	–	–	–	–	–	–
㉗	4.2	–	–	–	–	–	–
㉘	0	0	0	0	0	0	0
㉙	4.5	4.5	0	4.5	4.5	4.5	4.5
㉚	4.6	4.6	0	4.6	4.6	4.6	0
㉛	0.1	0.1	0.1	0.1	5.0	5.1	0.1
㉜	0	0	0	0	5.1	0	0
㉝	4.2	4.2	4.2	4.2	4.2	4.2	4.2
㉞	0	0	0	5.1	5.1	5.1	0
㉟	0	–	–	–	–	–	–
㊱	4.2	–	–	–	–	–	–
㊲	4.2	–	–	–	–	–	–
㊳	1.3	–	–	–	–	–	–
㊴	0	–	–	–	–	–	–
㊵	0	0	0	0	0	0	0
IC302-①	3.7	2.5	2.5	2.7	2.3	2.4	2.4
②	3.7	2.5	2.5	2.6	2.4	2.4	2.4
③	3.6	2.5	2.5	2.6	2.3	2.4	2.4
④	0	0	0	0	0	0	0
⑤	3.5	2.4	2.4	2.5	2.2	2.3	2.3
⑥	3.5	2.4	2.4	0	2.2	2.3	2.3
⑦	3.5	2.3	2.3	2.4	2.2	2.3	2.3
⑧	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Spannungstabellen · DC voltage tables

Servoregelung/Mechaniksteuerung Platte [0] [1]
Servo/Mechacon PWB [0] [1]

MODE / TR No.	STOP			PLAY			REC			FWD. SEARCH			REV. SEARCH			PLAY PAUSE			REC PAUSE		
	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E
Q 1	5.0	0	0	0	2.8	0	0	2.8	0	0	2.8	0	0	2.8	0	0	2.8	0	0	2.8	0
Q 2	0	0	0	0.4	0	0.4	2.8	0	0	2.8	0	0	2.8	0	0	2.8	0	0	2.8	0	0
Q 3	5.1	0	0	0	0.9	0	0	0.8	0	0	2.2	0	0	2.5	0	0	3.6	0	0	3.6	0
Q 4	0.3	0	0.9	0.6	0	1.2	0.6	0	1.2	1.9	0	2.4	2.2	0	2.8	3.3	0	3.8	3.6	0	3.8
Q 7	7.9	0	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9
Q 8	0	7.9	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9
Q 9	0	7.9	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9
Q 10	7.9	0	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9	–	–	7.9
Q 11	0	7.9	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0
Q 12	4.3	0.1	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0
Q 13	4.3	0.1	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0
Q 14	0	7.9	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–	0
Q 17	0	2.5	0	0	2.5	0	0	2.6	0	0	2.5	0	0	2.5	0	0	2.5	0	0	2.6	0
Q 32	4.2	0.1	0	2.1	2.5	0	2.1	2.5	0	2.1	2.5	0	2.1	2.5	0	4.1	0	0	4.2	–	0
Q 35	4.8	2.0	3.1	4.8	1.9	3.0	4.8	1.9	3.0	4.8	1.9	3.0	4.8	1.9	3.0	1.7	2.3	2.3	1.8	2.3	2.3
Q 43	0.1	2.8	0	0.1	2.8	0	0.1	2.8	0	4.8	0	0	4.8	0	0	0.1	2.8	0	0.1	2.8	0
Q201	0.1	1.2	0	2.0	0.7	0	2.0	0.7	0	2.0	0.7	0	2.0	0.7	0	2.0	0.7	0	2.0	0.8	0
Q202	4.3	0.1	0	2.2	0.7	0	2.2	0.7	0	2.2	0.7	0	2.2	0.7	0	2.2	0.7	0	2.2	0.7	0
Q203	0.1	1.2	0	2.1	0.7	0	2.1	0.7	0	2.1	0.7	0	2.1	0.7	0	2.1	0.7	0	2.1	0.7	0
Q204	1.3	0.7	0.7	0.7	4.0	0.5	0.8	4.0	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.0	0.5	0.8	4.6	0.6
Q205	0.6	0.1	0.2	0.8	4.1	0.5	0.8	4.0	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.8	4.6	0.6
Q206	0.6	0.2	0.7	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.7	0.6
Q207	0.6	0.2	0.1	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.7	0.6
Q208	0.6	0.2	0.2	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.1	0.5	0.7	4.7	0.5
Q209	0.6	0.7	0.2	0.7	4.1	0.5	0.7	4.0	0.5	0.7	4.0	0.5	0.7	4.1	0.5	0.7	4.0	0.5	0.7	4.6	0.6
Q210	0.7	0	0	5.5	3.0	5.7	5.4	2.9	5.7	5.5	3.0	5.8	5.4	2.9	5.7	5.4	2.9	5.7	6.3	3.4	6.0
Q211	0.2	0	0	5.4	2.9	5.7	5.4	2.9	5.7	5.5	3.0	5.8	5.4	2.9	5.7	5.4	2.9	5.7	6.4	3.4	6.7
Q212	0.2	0	0	0.5	2.9	0	5.4	2.9	5.7	5.5	2.9	5.8	5.4	2.9	5.7	5.4	2.9	5.7	6.3	3.4	6.6
Q213	0.2	0	0	0.5	2.9	0	0.5	2.9	0	0.5	3.0	0	0.5	2.9	0	0.5	2.9	0	0.6	3.4	0
Q214	0.2	0	0	0.5	2.9	0	0.5	2.9	0	0.5	3.0	0	0.5	2.9	0	0.5	2.9	0	0.6	3.4	0
Q215	0.7	0	0	0.5	2.9	0	0.5	2.9	0	0.5	3.0	0	0.5	2.9	0	0.5	2.9	0	0.6	3.4	0
Q303	9.6	5.1	10.1	9.5	5.1	10.1	9.6	5.1	10.1	9.5	5.1	10.1	9.5	5.1	10.1	9.5	5.1	10.1	9.6	5.1	10.1
Q304	10.2	1.9	10.2	9.8	2.9	10.1	9.8	2.9	10.1	9.5	6.3	10.1	9.5	6.3	10.1	10.0	9.9	10.1	9.9	10.0	10.1
Q307	10.2	0.1	10.2	9.7	5.7	10.1	9.7	5.7	10.1	9.6	5.8	10.1	9.6	5.8	10.1	9.7	5.8	10.1	9.6	6.6	10.1

Audio/**Servo-Platte** [0] [4]
Audio/**Servo PWB** [0] [4]

MODE / TR No.	STOP			PLAY			REC			FWD. SEARCH			REV. SEARCH			PLAY PAUSE			REC PAUSE		
	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E
Q101	9.7	0	0.1	9.7	0	0.1	9.8	0	0.2	9.7	0	10.2	9.6	0.1	0.1	9.7	0	10.2	9.7	0.1	0.1
Q102	0	0.2	0	0	0.1	0.1	0	0.1	0	0	10.2	0.1	0	0.1	0.1	0	10.2	0	0.1	0.2	0.1
Q103	9.6	0	0	9.6	0.1	0.1	9.6	0	0.2	9.6	0.1	0.1	9.6	0	0.1	9.7	0	0.2	9.6	0	0.2
Q104	0	0.2	0	0.1	0.2	0.1	0	0.1	0.1	0	10.2	0.1	0.1	0.1	0.1	0	0.1	0.1	0	0.1	0.1
Q105	0.1	0	0	0	0.1	0	0.1	0	0.1	0.1	0	0.1	0	0	0	0	0	0	0	0	0.1
Q106	0	0	0	0	0.1	0	0	0.1	0.1	0.1	0	0.1	0	0	0	0.1	0.1	0.1	0.1	0.1	0
Q107	1.9	0	1.9	0.2	4.9	5.0	2.0	2.3	2.8	5.1	5.7	6.0	7.0	0.1	7.2	9.6	0.1	0	9.7	0.1	0
Q108	0	1.9	0.1	3.0	3.0	2.4	2.8	2.8	2.2	6.0	6.1	5.6	0.2	7.2	0.1	0.1	9.9	0.1	0.1	0.1	0
Q109	1.9	0	1.9	2.9	0.1	3.0	2.8	0	2.9	5.9	0.1	6.0	6.3	6.6	7.2	9.5	0	0	9.6	0.1	0.1
Q110	0	1.9	0	0.1	3.0	0	0	2.8	0	0.1	5.3	0.1	7.2	7.2	6.2	0.1	0	0	0.1	0.1	0.1
Q111	0.1	0	0	0	2.4	0.1	0	2.2	0	0	5.2	0.1	0.7	0.1	0.8	0	0	0	0	0	0
Q112	0	0.1	0	0.1	2.4	0.1	0.1	2.2	0.1	0.1	6.0	0	0.7	0.1	0.1	0	0	0	0.7	5.0	0.1
Q113	0.1	0	0	0.7	0.1	0.8	0.7	0.1	0.7	0.7	0.1	0.7	0.1	6.0	0.1	0.1	0	0	0.7	5.0	0
Q114	0	0	0	0.8	0.1	0.0	0.8	0.1	0.1	0.7	0.1	0	0	6.3	0.1	0.1	0	0.1	0.1	5.0	5.0
Q115	0.6	5.0	0	0.6	4.9	0.1	0.7	5.0	0	0.7	5.0	0	3.7	0.1	0	0.7	5.0	0	4.9	3.5	5.0
Q116	0.7	4.9	0.1	0.8	4.9	0	0.8	5.0	0	4.6	0	0.1	0.7	4.9	0	0.7	5.0	0	5.0	3.4	5.0
Q117	0.1	5.0	5.0	2.2	2.4	3.1	0.2	5.0	5.0	5.1	3.1	5.0	5.1	3.6	5.0	0.1	5.0	5.0	0.1	0.1	0
Q118	5.0	3.4	5.0	4.9	3.4	5.0	4.9	3.4	5.0	5.0	3.1	5.0	0.1	5.0	0	5.0	3.5	5.0	0	0	0
Q119	4.9	3.4	5.0	5.0	3.5	5.0	5.0	3.5	5.0	0	5.0	5.0	0	0.1	0	5.0	3.4	5.0	1.1	0.5	0.2
Q120	0	1.4	0	0	1.4	0	2.8	0	0	0	1.4	0	0	1.4	0	0	1.4	0	0	1.4	0
Q121	5.0	0.1	5.0	5.0	4.4	5.0	5.0	4.4	5.0	5.0	4.4	5.0	5.0	0.1	5.0	5.0	0	5.0	5.0	0	5.0

Audio/**Servo-Platte** [0] [4]
Audio/**Servo PWB** [0] [4]

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC101							
①	0.2	0.1	0.1	0.1	0.1	0.2	0.2
②	9.7	9.7	9.7	9.6	9.6	9.7	9.7
③	0	0	0	0	0.1	0.1	0.1
④	0.1	0.1	0	0.1	0	0	0
⑤	0.1	0	0	0	0.1	0.1	0.1
⑥	0	0	0	0.1	0.1	0	0
⑦	0	0.1	0	0	0.1	0	0.1
⑧	0	0	0	0.1	0	0	0
⑨	0.1	0	0	0	0	0	0.1
⑩	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑪	5.0	5.0	5.0	5.0	5.0	0	4.9
⑫	0	0	0	0.1	0	0.1	0.2
⑬	0	0	0.1	0.1	0.1	0	0.1
⑭	0	0	0.1	0	0	0	0
⑮	0.1	0.1	0.1	0.1	0.1	0.1	0
⑯	9.7	9.6	9.7	9.6	9.6	9.7	9.6
IC102-							
①	1.9	2.9	2.8	6.2	7.0	9.9	0
②	1.9	2.0	2.0	5.3	6.8	9.5	9.6
③	0	2.9	2.8	6.1	0.2	3.1	0
④	0.1	0.1	0	0.1	5.1	0.1	0.1
⑤	0	0	0	0.1	3.0	0	0
⑥	0	0	0	0	2.5	0	0
⑦	0.1	0.1	0.1	0	0.1	0.1	0.1
⑧	0.1	0	0.1	0	0	0	0
⑨	0	0.1	0.1	0	0.1	0	0
⑩	5.0	4.9	5.0	5.0	5.0	5.0	5.0
⑪	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑫	0	2.4	2.5	2.4	0.1	0	0
⑬	0.1	3.1	3.1	3.0	0.1	0	0
⑭	0.1	5.1	5.2	5.1	0.1	0	0.1
⑮	0	0.1	0.1	0.1	7.0	0.1	0
⑯	1.9	2.8	2.9	6.1	6.0	9.5	9.6
IC103-							
①	0.1	0	0	0.1	0	0	0
②	1.4	1.4	1.4	1.4	1.4	1.4	1.4
③	1.4	1.3	1.4	1.4	1.4	1.4	1.4
④	1.4	1.4	1.3	1.4	1.4	1.3	1.3
⑤	1.4	1.3	1.4	1.3	1.3	1.4	1.4
⑥	4.5	2.6	2.6	2.5	2.5	4.5	4.5
⑦	0.7	0.6	0.7	0.7	3.7	0.7	0.7
⑧	0	0	0.1	0	0.1	0.1	0
⑨	0.2	0.1	0.1	0.1	0	0.2	0.2
⑩	0	1.1	0.9	1.0	0.1	0.1	0
⑪	4.3	2.2	2.2	1.4	1.4	4.2	4.3
⑫	5.0	1.8	1.6	1.6	1.6	5.0	4.9
⑬	3.4	2.9	2.7	2.7	2.7	3.4	3.3
⑭	3.5	2.6	2.6	2.6	2.6	3.3	3.4
⑮	0.7	2.4	2.7	2.8	2.8	0.7	0.7
⑯	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IC104-							
①	1.4	1.3	2.5	1.4	1.4	1.4	1.4
②	1.4	1.4	1.5	1.4	1.5	1.4	1.5
③	1.4	1.4	1.6	1.3	1.4	1.4	1.4
④	0	0	0.1	0.1	0.1	0.1	0
⑤	2.0	1.9	2.0	2.0	2.0	2.0	2.0
⑥	0.6	0.6	2.7	2.8	2.8	0.6	0.5
⑦	0	0	0	0	0	0	0
⑧	5.0	5.0	5.0	5.0	5.0	5.0	5.0

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC105-							
①	3.9	2.3	2.4	2.4	2.3	2.3	2.6
②	0.7	2.5	2.5	2.6	2.5	2.5	2.5
③	1.7	2.5	2.5	2.6	2.4	2.5	2.6
④	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑤	0.4	0.4	0.4	0.4	0.4	0.4	0.3
⑥	0.4	0.3	0.3	0.3	0.3	0.3	0.3
⑦	0	0	0.1	0	0	0	0
⑧	0	0	0	0	0	0	0
⑨	3.3	2.5	2.6	2.6	2.5	2.5	2.6
⑩	1.7	1.7	1.7	1.6	1.7	1.7	1.7
⑪	0	0	0	0.1	0.1	0	0
⑫	3.4	3.3	3.3	3.3	3.4	3.3	3.3
⑬	3.4	2.6	2.7	2.6	2.4	2.5	2.6
⑭	3.2	3.9	3.9	3.9	3.8	3.9	3.9
IC106-							
①	0.1	0.1	0.1	0.1	0	0	0.1
②	1.4	1.4	1.4	1.4	1.4	1.3	1.4
③	1.5	1.4	1.5	1.4	1.4	1.5	1.4
④	1.4	1.4	1.4	1.4	1.4	1.4	1.4
⑤	1.4	1.4	1.4	1.4	1.4	1.4	1.4
⑥	4.3	2.3	2.3	2.2	2.3	2.2	2.2
⑦	0.7	0.6	0.7	0.7	3.7	0.6	0.7
⑧	0.1	0	0.1	0	0	0	0
⑨	0.1	0.1	0.1	0.1	0.1	0.2	0.2
⑩	0.1	0.2	0.2	0.2	0.0	0.2	0.2
⑪	4.2	2.2	2.2	2.2	2.2	2.2	2.2
⑫	5.0	1.6	1.6	1.5	1.6	1.6	1.5
⑬	3.4	2.7	2.8	2.7	2.8	2.7	2.8
⑭	3.6	2.6	2.6	2.6	2.6	2.6	2.6
⑮	0.7	2.5	2.6	2.6	2.4	2.5	2.5
⑯	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Spannungstabellen · DC voltage tables

Servoregelung/**Mechaniksteuerung** Platte [0] [1]
Servo/**Mechacon** PWB [0] [1]

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC1-①	10.1	10.2	10.2	10.1	10.1	10.2	0.2
②	0	0	0	0	0	0.1	0.1
③	4.9	5.0	5.0	5.0	5.0	5.0	5.0
IC5-①	0	0	0	0	0	0	0
②	0	0	0	0	0	0	0.1
③	0	0	0	0	0	0	0.1
④	0.1	0	0	0	0	0	0
⑤	5.0	0	0	0	0	0	0
⑥	0	0	0.1	0	0	0.1	0
⑦	0.1	0	0	0	0	0	0
⑧	5.0	4.9	5.0	5.0	5.0	5.0	5.0
⑨	5.1	4.9	5.0	5.0	5.0	5.0	5.0
⑩	0	0	0.1	0	0	0.1	0
⑪	0.2	0.2	0.3	0.3	0.2	0.2	0.2
⑫	5.0	4.9	4.9	4.9	4.9	4.9	4.9
⑬	0	0	0	0	0	0.1	0.1
⑭	0	1.3	1.4	1.3	1.3	1.3	1.3
⑮	0	2.3	2.4	2.4	2.5	2.4	2.5
⑯	5.0	5.0	5.0	5.0	5.0	5.0	5.1
IC6-①	0	0	0	0	0	0	0.1
②	10.1	10.1	10.0	9.9	9.9	10.0	9.9
③	5.2	0	5.2	0	0	5.1	5.1
IC8-①	5.1	5.1	5.1	5.0	5.1	5.0	5.1
②	5.0	5.0	5.0	5.0	5.0	4.9	4.7
③	5.1	5.2	5.1	5.0	5.0	5.1	5.1
④	0	4.9	5.0	5.0	0	5.0	5.0
⑤	5.1	5.1	5.1	5.0	5.0	5.1	5.1
⑥	5.1	5.0	0	0	0	0.1	0
⑦	5.1	1.1	5.0	5.0	5.0	5.0	5.1
⑧	4.9	0.1	0	0.1	0	0	0
⑨	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑩	0	0	0	0	0.1	0.1	0
⑪	0	0	0	0	0	0	0
⑫	5.1	5.0	4.9	5.0	5.0	5.0	4.9
⑬	0	0	0	0	0	0	0
⑭	5.1	5.0	5.0	5.0	5.0	5.0	5.1
⑮	5.0	0	0.1	0	0	0	0
⑯	5.0	5.1	5.1	5.0	5.0	5.0	5.1
⑰	5.1	5.0	0	0	0.1	0	5.0
⑱	5.1	5.1	5.0	5.1	5.0	5.1	5.1
⑲	5.1	5.1	5.1	5.1	5.1	5.1	5.1
⑳	5.1	5.1	5.1	5.1	5.0	5.1	5.1
IC9-①	5.1	5.1	5.1	5.0	5.1	5.1	5.1
②	5.1	5.1	0.1	5.1	5.1	5.1	5.1
③	5.1	0.1	0	5.1	5.1	5.1	5.1
④	0.1	5.1	0	5.1	5.1	5.1	0.1
⑤	5.1	5.1	0	5.1	5.0	5.0	0.1
⑥	5.1	5.1	5.2	5.1	5.1	5.1	5.1
⑦	4.9	2.4	0.1	0.6	4.9	0	0
⑧	5.2	0.1	1.3	5.1	1.6	0.1	0
⑨	3.3	0.1	0.1	0.1	0	0	0.1
⑩	3.3	3.3	3.3	3.3	0.1	3.3	3.3
⑪	5.1	5.1	5.1	5.1	5.1	5.1	0
⑫	5.1	5.2	5.1	5.1	5.0	5.1	0
⑬	5.0	5.0	4.9	4.9	4.9	4.9	0
⑭	5.1	5.0	5.0	5.1	5.0	5.0	0

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC9-⑮	5.1	5.1	5.1	5.0	5.0	5.1	0
⑯	5.1	5.1	5.1	5.0	5.1	5.1	0
⑰	5.1	0	0	0	0	0.1	0
⑱	0	5.1	5.1	5.1	0	0.1	0
⑲	0	0	0.1	0.1	5.0	0.1	0
⑳	5.1	0	0	0.1	0	0.1	0
㉑	0	0	0.1	0	0	0	0
㉒	0	0	0	0.1	0	0.1	0
㉓	2.7	2.7	2.7	2.7	2.7	2.7	0
㉔	2.8	2.9	2.8	2.8	2.8	2.8	0
㉕	5.2	5.1	5.2	5.1	5.0	5.1	0
㉖	5.2	5.2	5.2	5.1	5.1	5.1	0
㉗	5.1	5.1	5.1	5.2	5.1	5.1	0
㉘	0.1	0.1	0.1	0	0.1	0	0
㉙	0.1	0	0.1	0	0	0.1	0
㉚	5.0	4.9	0.1	4.9	5.0	5.0	0.1
㉛	5.1	5.1	0.1	5.1	5.0	5.1	0.1
㉜	0.1	0.1	0.1	5.0	5.1	5.0	0
㉝	5.1	5.1	0.1	5.1	5.1	5.1	0
㉞	5.1	0.1	5.1	0.1	0.1	0	0
㉟	0.1	0.2	0.1	5.1	5.1	0.1	0
㊱	0	2.6	2.6	2.5	2.5	0.1	0
㊲	0	2.6	2.5	2.6	2.5	2.5	0
㊳	5.1	5.0	5.1	0	5.1	5.1	0
㊴	5.1	5.1	5.1	5.0	0	0	0
㊵	0.1	5.0	5.1	5.1	5.0	0	0
㊶	5.0	5.1	0	5.0	5.1	0	0
㊷	5.1	5.0	5.1	5.1	5.1	0	0.2
㊸	5.1	5.0	5.1	5.0	5.1	0	0
㊹	5.1	0	0	0.1	0.1	0	0
㊺	0.6	0.6	0.6	0.6	0.6	0.6	0.6
㊻	0	0	0.1	0	0	0	0
㊼	0.1	0	0	0	0	0	0
㊽	0.1	5.0	5.0	0.1	0.1	0	0
㊾	0.1	0	0.1	5.0	5.0	0	0
㊿	5.1	5.1	5.1	5.1	5.0	0	0
(51)	5.1	5.1	5.1	5.1	5.0	0	0
(52)	5.1	5.1	5.1	5.0	5.1	0	0
(53)	5.0	5.1	5.1	5.0	5.1	0	0
(54)	0	0	0.1	0	0	0	0
IC10-							
①	5.0	0	0	0	0	0.1	0
②	5.0	5.1	5.0	5.1	5.1	0	0
③	5.1	5.0	0	5.0	5.1	5.0	0
④	0.1	5.0	5.0	5.0	5.0	5.1	5.1
⑤	5.1	5.1	5.0	5.1	0	5.0	5.1
⑥	5.1	5.1	5.0	0	5.0	5.1	5.1
⑦	5.0	5.0	0	4.9	5.0	5.0	5.0
⑧	0	0	0.1	0	0.1	0	0.1
⑨	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑩	7.5	5.0	0	5.2	5.1	5.0	7.6
⑪	0.6	3.9	1.3	0.1	0.7	3.8	0.6
⑫	0.6	3.8	0.7	0.7	0	3.8	0.6
⑬	0.1	3.9	0.7	0.6	0.7	3.9	0.6
⑭	0.6	3.8	0	0.6	0.7	3.9	0
⑮	3.9	3.9	3.8	3.8	3.9	0.1	0
⑯	3.8	0.1	0.1	0	0	0.0	0.1

Servoregelung/**Mechaniksteuerung** Platte [0] [1]
Servo/**Mechacon** PWB [0] [1]

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC11-							
①	5.1	5.1	5.1	5.1	5.1	5.1	5.1
②	0	0	0	0	0	0.1	0.1
③	5.2	5.1	5.0	5.1	5.1	5.1	5.1
④	5.1	5.1	5.1	5.0	5.1	5.1	5.1
⑤	0	0	0	0	0.1	0	0
⑥	5.1	5.1	5.0	5.1	5.1	5.1	5.1
⑦	0.1	0	0.1	0	0	0.1	0.1
⑧	5.1	5.1	5.1	5.0	5.0	5.1	5.1
⑨	5.1	5.1	5.2	5.1	5.1	5.1	5.2
⑩	5.1	5.1	5.1	5.1	5.1	5.1	5.1
⑪	0	0	0	0.1	0	0	0
⑫	0.1	0.1	0.1	0	0	0	0.1
⑬	0	0.1	0	0	0.1	0	0
⑭	5.1	5.1	5.2	5.1	5.1	5.1	5.1
IC12-							
①	5.1	0	0	5.1	5.1	5.1	5.2
②	5.0	5.0	0.1	5.0	5.0	5.0	5.0
③	0	5.1	5.1	0.1	0	0.1	0.1
④	0.1	0	0.1	0	0.1	0	0.1
⑤	5.1	5.1	5.1	5.1	5.1	5.1	5.1
⑥	5.2	5.2	5.1	5.1	5.0	5.1	5.1
⑦	0	0	0	0	0	0.1	0.1
⑧	2.6	0.9	0.1	0.6	0.7	3.8	0.1
⑨	0	0	0	0	0	0	0.1
⑩	5.1	5.1	5.2	5.2	5.2	5.2	5.1
⑪	0	5.1	5.1	5.1	5.1	5.1	5.1
⑫	5.1	5.1	0.1	5.1	5.1	5.1	0.1
⑬	5.1	0	5.1	0.1	0.1	0	5.1
⑭	5.1	5.2	5.1	5.1	5.1	5.1	5.1
IC13-							
①	5.1	5.1	0	5.1	5.1	5.1	5.1
②	0	0	5.1	0	0.1	0	0
③	0.9	4.1	0.9	3.6	3.5	2.2	0.8
④	0.4	0.1	1.7	0.1	1.4	4.8	5.1
⑤	1.3	1.2	1.2	3.3	1.3	4.5	4.6
⑥	0.3	0	0.1	1.6	4.9	0.1	0
⑦	0.1	0	0	0	0	0	0
⑧	0	0.1	0.1	0	0.1	0	0
⑨	5.1	5.1	5.1	5.1	5.1	5.1	5.2
⑩	5.1	5.2	5.1	5.1	5.1	5.1	5.1
⑪	0.1	0	0	0.1	0	0	0
⑫	0.1	0	0	0	0	0	0.1
⑬	4.9	4.9	4.9	4.9	4.9	4.9	4.9
⑭	5.2	5.2	5.1	5.1	5.1	5.1	5.2
IC14-							
①	0	0	0	0	0	0	0
②	3.0	3.0	3.0	3.0	3.0	0.1	3.0
③	2.5	2.5	2.5	2.5	2.5	0	2.5
④	5.0	5.0	5.0	5.0	5.0	0	5.0
⑤	2.5	2.5	2.6	2.5	2.5	0	2.5
⑥	2.9	2.9	2.9	2.9	2.8	0	2.9
⑦	0	0	0	0	0	0	0
⑧	0.7	0.7	0.7	0.8	0.7	0	0
⑨	1.4	1.4	1.4	1.5	1.4	0	0
⑩	0.6	0.6	0.6	0.6	0.6	0	0.6
⑪	0	0	0	0	0	0	0
⑫	0.1	0.1	0.1	0.1	0.1	0	0.1
⑬	2.5	2.5	2.5	2.5	2.4	0.1	2.5
⑭	0	0	0.1	0	0	0	0

MODE / IC No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
IC401-							
①	4.9	0	0	0	0.1	0	0
②	0.1	0.1	0	0	0	0	0
③	5.0	5.0	5.0	4.9	4.9	0	0
④	5.0	5.0	5.0	5.0	4.9	0	0.1
⑤	0.1	0	0.1	0	0.1	0	0
⑥	0.1	5.0	5.1	5.0	4.9	0	0
⑦	0	0	0.1	0.1	0	0	0
⑧	5.0	0.1	0	0	0	0	0
⑨	5.0	0	0.1	0	0.1	0	0
⑩	0.1	5.0	5.0	0	4.9	0	0
⑪	5.0	5.0	5.0	5.0	5.0	0	0
⑫	0	0	0	0.1	0	0	0
⑬	0	0	0	5.0	0	0	0
⑭	5.0	5.0	5.0	5.0	5.0	0	0
IC402-							
①	4.8	4.8	4.8	0	4.8	0	0
②	4.8	4.8	—	4.8	4.8	4.8	0
③	4.9	4.9	4.9	4.9	4.9	4.9	0
④	0	0	0	0	0	0	0
⑤	0	0	0	0	0	0	0
⑥	0	0	0	0	0	0	0
⑦	0	0	0	0	0	0	0
⑧	4.9	4.9	4.9	4.9	4.9	4.9	4.9
⑨	4.9	4.9	4.9	4.9	4.9	4.9	0
⑩	4.9	4.9	4.9	4.9	4.9	4.9	4.9
⑪	4.9	4.9	4.9	4.9	4.9	4.9	4.9
⑫	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑬	4.8	0	4.8	4.8	4.8	4.8	0
⑭	4.9	4.9	4.9	4.9	4.9	4.9	4.9

Spannungstabellen · DC voltage tables

Servoregelung/**Mechaniksteuerung** Platte [0] [1]
Servo/**Mechacon** PWB [0] [1]

MODE / TR No.	STOP			PLAY			REC			FWD. SEARCH			REV. SEARCH			PLAY PAUSE			REC PAUSE		
	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E	B	C	E
Q 5	0	4.6	0	5.1	0.1	0.1	0	4.6	0	5.1	0.1	0	5.1	0	0	5.1	0.1	0	0.1	4.6	0.1
Q15	5.0	0	5.1	5.0	0.1	5.0	5.0	0.2	5.0	4.9	0.1	5.0	5.0	0.1	4.9	5.0	0.1	5.0	5.0	0.2	5.0
Q16	5.1	0.1	0	0.1	4.6	0	5.1	0	0	0	4.6	0	0	4.6	0	0	4.5	0	5.1	0.1	0
Q19	10.2	0	10.1	10.1	0.1	10.2	10.1	0	10.2	10.1	0.1	10.1	10.1	0	10.1	10.1	0	10.1	10.2	0	10.1
Q20	5.2	0	5.2	5.1	0.1	5.2	5.1	0	5.1	5.1	0	5.1	5.1	0.1	5.1	5.1	0.1	5.1	5.1	0.1	5.2
Q22	0	10.2	0	0	10.2	0	0	10.1	0	0	10.1	0	0	10.1	0	0	10.2	0	0	10.2	0
Q23	0.1	10.2	0	0	10.1	0.1	0.1	10.2	0	0	10.1	0	0	10.1	0	0	10.2	0	0	10.1	0
Q24	3.7	0.1	0.1	0.1	2.5	0	0	2.5	0	1.2	10.1	0	5.1	3.8	0.1	0	2.5	0.1	0	2.9	0
Q25	3.9	5.1	3.3	3.8	5.2	3.3	3.9	5.1	3.4	3.9	5.2	3.4	3.9	5.1	3.3	3.8	5.2	3.4	3.9	5.1	3.4
Q26	5.0	0.1	0	5.0	0	0	0.1	3.3	0	5.0	0.1	0	5.0	0	0	5.0	0.1	0	5.0	0.1	0
Q27	4.7	0	0	0.1	7.1	0	4.6	0.1	0	0	7.1	0	0.1	7.1	0	0	7.0	0	4.6	0.1	0
Q28	0	5.0	0	0.1	4.9	0	3.7	0	0	0	5.0	0	0.1	5.0	0	0.1	5.0	0.1	0.1	5.0	0.1
Q29	0	2.0	0	5.1	0	0	5.1	0	0	5.1	0	0	5.1	0	0.1	5.1	0.1	0	5.1	0.1	0
Q30	0.1	2.7	0	3.6	0	0	3.6	0	0	3.5	0.1	0.1	3.5	0	0	3.6	0	0	3.6	0	0
Q31	5.1	0	0	5.1	0	0.1	0	0.1	0	5.1	0	0	5.1	0	0	5.1	0	0	0	0.1	0
Q33	0	5.1	0	2.1	2.5	0	2.1	2.6	0	2.1	0.5	0	2.0	2.6	0	2.1	2.5	0	2.1	2.6	0
Q34	5.0	0	0	5.0	0	0	5.0	0	0	5.0	0	0	5.0	0	0	5.0	0	0	5.0	0	0
Q36	0	5.0	0	4.5	0.1	0	0.1	5.0	0	4.6	0.1	0.1	4.6	0.1	0.1	4.6	0	0.1	0	5.1	0
Q37	0	0.1	0.1	4.1	0	0	4.2	0	0	4.2	0	0	4.2	0	0	4.2	0	0	4.2	0	0
Q38	0	4.2	0	0.1	0.1	0	0.1	4.2	0	0.1	4.2	0.1	0	4.2	0.1	0	4.2	0	0	4.2	0.1
Q39	0.1	0	0	0	1.6	0	0.1	1.5	0	0	1.6	0	0	1.5	0	0	1.5	0.1	0.1	1.6	0.1
Q40	0.5	0	0	0.1	2.5	0	0	2.6	0	0.1	2.5	0	0	2.5	0.1	0.1	2.5	0	0	2.9	0.1
Q41	5.1	3.8	0	5.1	3.8	0	0	2.1	0	5.1	3.8	0	0	2.5	0	5.1	3.8	0.1	5.1	3.8	0
Q42	0	10.2	0	0.1	10.1	0	0	10.1	0	0.1	2.5	0	0	10.1	0	0	10.1	0	0	10.2	0

Servoregelung/Mechaniksteuerung Platte [0] [1] (Steckeranschlüsse)
Servo/Mechacon PWB [0] [1] (Connectors)

MODE / CN No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
CN1-①	3.8	3.8	3.8	3.8	3.9	0	0.1
②	3.8	0.1	0.1	0	0.1	0	0
③	0.6	3.9	0	0.7	0.7	3.9	0.1
④	5.1	5.1	5.1	5.1	5.1	5.1	5.1
⑤	5.1	5.1	5.0	5.0	5.1	5.0	4.9
⑥	5.1	5.2	5.1	5.1	5.1	5.1	5.1
⑦	0.1	2.5	0.1	0	4.2	4.9	4.9
⑧	0.1	0	0	0.1	0	0	0.1
⑨	0	0	0	0	0	0.1	0.1
⑩	5.0	5.0	5.0	0.1	5.0	5.0	5.0
⑪	0	0	0.1	0.1	0.1	0	0
⑫	0	0.1	0	0	0	0	0
⑬	0	0	3.3	0	0.1	0	0
⑭	0.1	3.8	3.9	0.6	0.7	3.8	0.6
⑮	0.6	3.8	0.7	0.7	0	3.9	0.6
⑯	0.6	3.8	0.7	0	0.7	3.9	0.6
⑰	5.1	5.1	5.1	5.1	5.1	5.1	5.1
⑱	5.1	5.2	5.1	5.0	5.1	5.1	5.2
⑲	5.0	5.1	5.1	5.0	5.1	5.1	5.1
⑳	5.1	5.1	5.1	5.1	5.2	5.2	5.1
㉑	3.4	3.4	3.4	3.2	3.4	3.3	3.4
㉒	3.3	0.1	0.1	0.1	0.1	0	0.1
㉓	3.4	0	3.3	3.3	0	3.3	0
㉔	0	0.1	0.1	0	0	0	0
㉕	0	0	0	0	0	0	0
㉖	0	0.1	0	0	0.1	0.1	0

MODE / CN No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
CN2-①	4.0	3.9	2.6	4.0	4.0	3.9	4.0
②	0.1	4.6	0.1	4.6	4.5	4.6	0
③	5.0	0.1	5.0	0.1	0.1	0.1	5.0
④	5.1	5.0	5.0	5.0	5.0	5.0	5.0
⑤	3.0	2.7	2.7	2.6	2.6	2.6	2.8
⑥	0.4	0.4	0.4	0.4	0.4	0.4	0.4
⑦	6.7	6.7	6.4	6.6	6.7	6.3	6.7
⑧	0 0	0	0.1	0.1	0	0.1	0
CN3-①	3.1	0	0.1	0.1	0.1	0	0
②	2.0	0	0.1	0	0	0.1	0
③	4.2	0.1	0	5.1	5.1	5.0	0.1
④	0	5.0	5.0	5.0	5.0	5.0	5.0
⑤	3.1	4.0	3.8	4.0	4.1	3.9	4.0
⑥	2.0	0	0.1	0.1	0	0	0.1
⑦	4.2	2.2	2.1	2.1	2.1	2.1	2.1
⑧	0	0	0.1	0	0	0.1	0.1

Servoregelung/Mechaniksteuerung Platte [0] [1] (Steckeranschlüsse)
Servo/Mechacon PWB [0] [1] (Connectors)

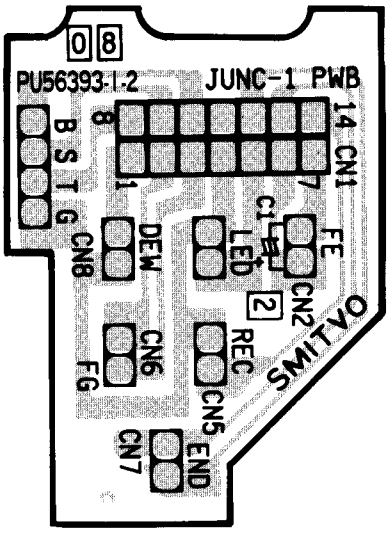
MODE / CN NO.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
CN4-①	0.6	2.5	2.4	2.6	2.4	2.5	2.5
②	0.5	2.8	2.8	2.7	2.8	4.6	4.5
③	0	0	0	0	0	0.1	0
④	4.8	2.6	2.6	2.6	2.6	4.7	4.7
⑤	4.2	2.3	2.3	1.4	1.4	4.3	4.3
⑥	0.1	0.1	0.1	0.1	5.1	0.1	0
⑦	0.1	0.1	0.1	5.1	5.1	0.1	0.1
⑧	0.1	5.2	5.2	5.1	0.1	0	0.1
⑨	5.0	0	0	0.1	0	0	0
⑩	0.1	0.1	0.1	0	0	0	0.1
⑪	3.9	2.3	2.3	2.4	2.4	2.3	2.6
⑫	0.7	2.7	2.7	2.8	2.9	0.7	0.8
⑬	0	0.1	0	0	0.1	0.1	0.1
⑭	0.1	2.1	2.1	2.1	2.2	2.1	2.1
⑮	0.1	0.1	0	0	0	0.1	0
⑯	10.2	10.1	10.1	10.1	10.1	10.1	10.2
⑰	0	0	0	0	0.1	0	0.1
⑱	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑲	0.1	0	0	0.1	0	0	0
⑳	1.8	2.8	2.8	5.9	6.9	10.0	10.0
㉑	0	0.1	0.1	0	0	0	0
㉒	0	0.1	0	0	0.1	0.1	0
㉓	4.9	0	0	0.1	0	0.1	0
㉔	0.1	0	5.0	5.0	0	5.0	5.0
㉕	0.1	0.1	0	0	0	0.1	0.1
㉖	1.0	0.9	2.4	0.9	1.0	1.0	1.0
㉗	3.0	3.1	2.3	2.1	2.4	2.2	2.3
㉘	0	0	0.1	0	0.1	0.1	0
CN5-①	0.1	4.2	0.1	4.1	4.1	4.1	0
②	0	0.1	5.1	0.1	0	0	0
③	0.1	5.1	5.1	0	0.1	0.1	0.1
④	0	0.1	0	0	0	0.1	0
⑤	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑥	6.5	6.7	6.4	6.7	6.7	6.4	6.6
⑦	0.3	0.9	0.3	0.7	0.8	0.2	0.2
⑧	0.1	0	0	0	0	0	0.1
⑨	5.0	0.1	0	0.1	0	0	0
⑩	0.1	2.3	2.4	2.3	2.3	2.3	2.3
CN6-①	0.2	0.2	0.2	0.1	0.1	0.1	0.2
②	0	0.1	0	0	0	0	0
③	0	0	0	0.1	0.1	0	0
④	0	0	0.1	0.1	0	0	0.1
⑤	0.1	0.1	0.1	0.1	0.1	0.1	0.1
⑥	0.2	0.5	0.3	0.7	0.8	0.3	0.2
⑦	0.1	0.4	0.1	1.1	0.7	0.2	0.1
⑧	0.9	0.8	1.0	1.6	4.3	0.8	0.9
⑨	4.6	4.6	4.4	1.2	1.9	1.4	1.3
⑩	2.1	2.2	2.2	2.2	2.1	2.2	2.1
⑪	0	0	0	0.1	0	0	0
⑫	0.5	0.4	0.4	0.5	0.4	0.5	0.4
⑬	5.1	5.0	5.0	5.0	5.0	5.0	5.0
⑭	0.1	0.1	0	0	0.1	0	0
CN7-①	0	0	0.1	0.1	0.1	0	0.1
②	0	0.1	0.1	0	0	0	0

MODE / CN NO.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
CN8-①	0	0	0	0.1	0	0.1	0
②	0	0	0.1	0	0.1	0	0
③	0	2.9	2.9	3.0	3.0	2.9	3.3
④	0.1	2.8	2.9	3.0	2.9	2.9	3.3
⑤	0.1	2.9	3.0	3.0	3.0	2.9	3.3
⑥	3.6	3.5	3.6	3.6	3.6	3.6	3.6
⑦	4.3	4.3	4.3	4.3	4.4	4.3	4.2
⑧	3.6	3.6	3.6	3.5	3.7	3.6	3.6
⑨	0.9	0.8	0.8	0.8	0.9	0.8	0.8
⑩	0	0	0	0	0	0	0
⑪	2.2	2.2	2.2	2.2	2.4	2.2	2.2
⑫	0.8	0.8	0.8	0.8	0.8	0.8	0.8
⑬	2.3	2.2	2.2	2.3	2.2	2.2	2.3
CN9-①	0.1	0	0	0	0	0	0
②	0.1	0.1	0	0.1	0	0	0
CN10-①	4.3	2.2	2.1	2.1	2.1	2.1	2.1
②	4.3	2.8	2.7	2.6	2.9	2.4	2.9
③	6.5	4.6	2.4	5.0	5.2	5.2	2.4
④	6.4	4.5	2.3	5.4	5.0	5.2	2.2
⑤	0	0.1	0.1	0	0	0	0
⑥	0.1	5.0	2.3	5.1	4.3	5.0	2.1
⑦	6.5	4.4	2.4	5.1	5.3	0	1.4
⑧	0	0	0.1	0.1	0	0	0
CN11-①	5.0	5.0	0.1	0	0	0.1	5.0
②	5.2	5.2	5.1	5.1	5.1	5.1	5.1
③	0.1	0.1	0	0.2	0.2	0.2	0.1
④	2.9	3.9	3.8	4.1	4.1	3.9	4.2
⑤	0	0.1	0	0	0	0	0
⑥	0.1	0	0.1	0	0	0.1	0
⑦	0	0	0	0	0	0.1	0.1
⑧	0.1	0	0	0	0.1	0	0
⑨	5.0	5.0	5.0	5.0	5.0	5.0	5.0
⑩	6.6	6.4	6.4	6.7	6.6	6.4	6.9
⑪	0.1	0	0	0	0.1	0	0.1
⑫	10.1	10.1	10.1	10.1	10.0	10.1	10.1
⑬	5.1	5.2	5.2	5.1	5.1	5.1	5.1
CN12-①	5.1	5.2	5.1	5.1	5.2	5.2	5.1
②	0.1	0	0	0	0	0	0
③	0.5	2.8	2.8	3.2	2.6	2.5	4.6
④	0	2.8	2.8	2.4	2.7	2.5	4.5
⑤	0.1	0	0	0	0	0.1	0.1

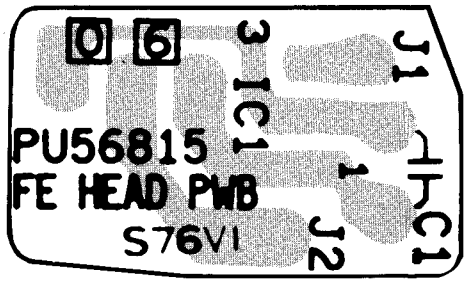
[0][4] Audio/Servo Platte (Steckeranschlüsse)
Audio/Servo PWB (Connectors)

MODE / CN No.	STOP	PLAY	REC	FWD. SEARCH	REV. SEARCH	PLAY PAUSE	REC PAUSE
CN2- ①	7.9	5.1	7.5	5.3	5.3	5.3	7.9
②	7.9	5.1	7.5	5.3	5.3	5.4	8.0
CN3-							
①	0	0	0	0	0	0	0
②	0	0	0	0	0	0	0.1
③	0	0	0	0	0	0.1	0.1
CN4-							
①	0	0	0	0.1	0.1	0	0
②	4.3	4.2	4.3	4.2	4.2	4.2	4.3
③	2.0	1.8	1.8	1.7	1.7	1.6	1.6
CN5-							
①	0	0	0	0	0	0.1	0
②	0	0	0	0	0	0	0
③	7.9	7.9	7.7	7.9	8.0	8.0	7.9
CN11-							
①	5.0	0	0.1	0	0	0	0
②	5.0	0.1	0.1	0	0	5.0	5.0
③	0	5.0	5.1	4.9	0	5.0	5.0
④	0	0	0.1	0	0	0	0
CN12-							
①	2.4	0.1	0.1	2.5	0	2.3	0.2
②	0	0	0	0.1	0.1	0	0
③	0.1	0.1	0	0.1	0.1	0.1	0
CN13-							
①	0	0.1	0.1	0	0	0	0
②	0	0.1	0	0	0	0.1	0
CN14-							
①	0	0	0	0	0.1	0	0.1
②	0	0	0.1	0	0	0.1	0.1
③	0.1	2.2	2.2	5.8	0.1	1.8	0
④	0	0.1	0	0.1	0	0.1	0
⑤	0	0	0.1	0.1	6.3	0.1	0.1

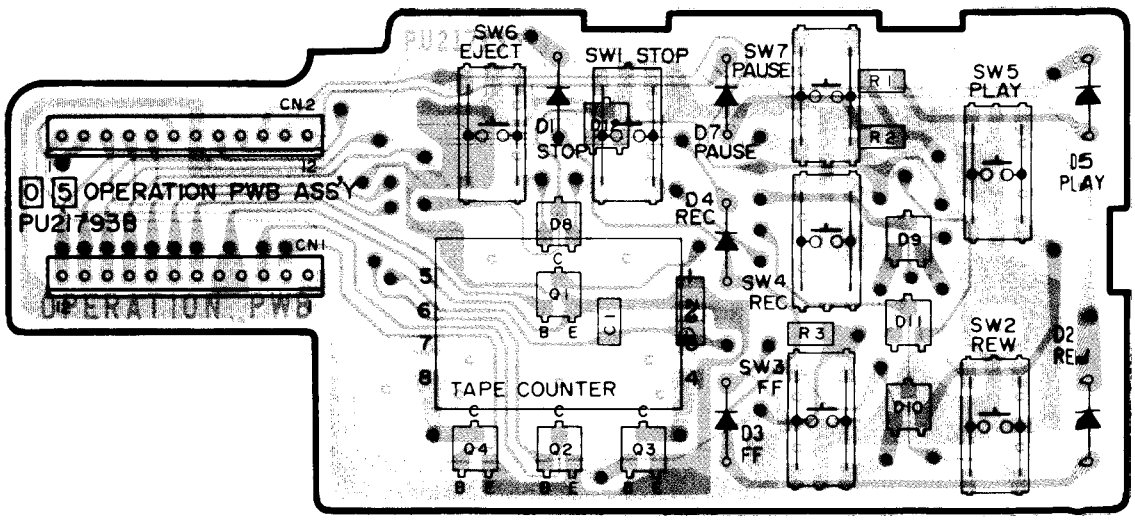
[0][8] Verbindungsplatte
Junction PWB



[0][6] Löschkopfplatte
Full erase head PWB



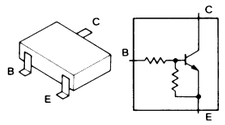
[0][5] Tastenplatte
Operation PWB



Mechaniksteuerung Schaltbild
Mechacon circuit diagram

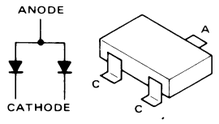
MCM1053

DTC114YK



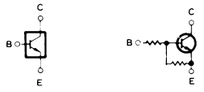
GL-1HD202

MA151WA

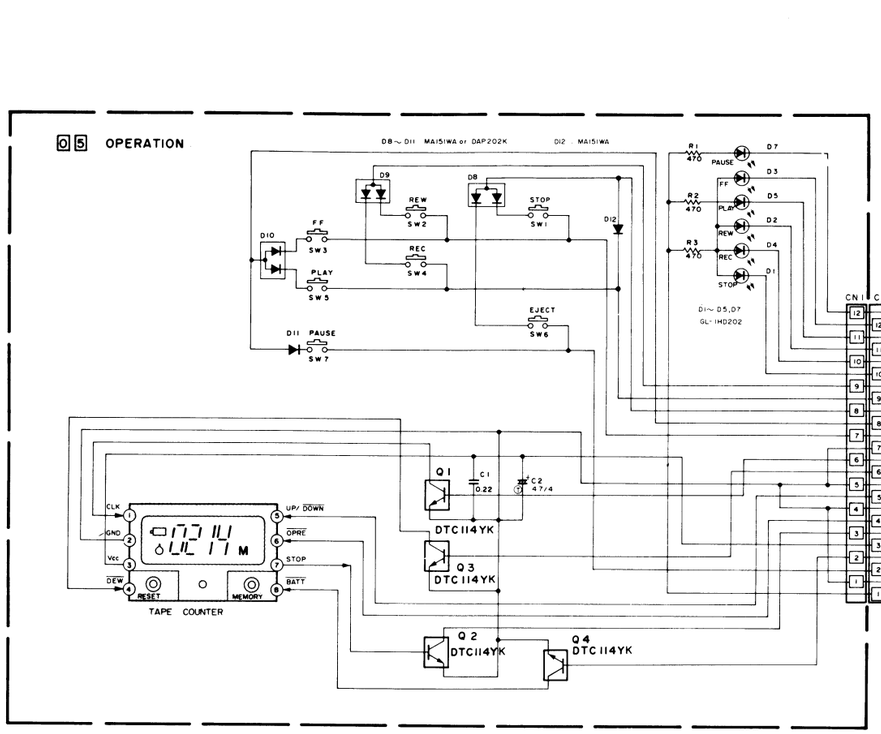


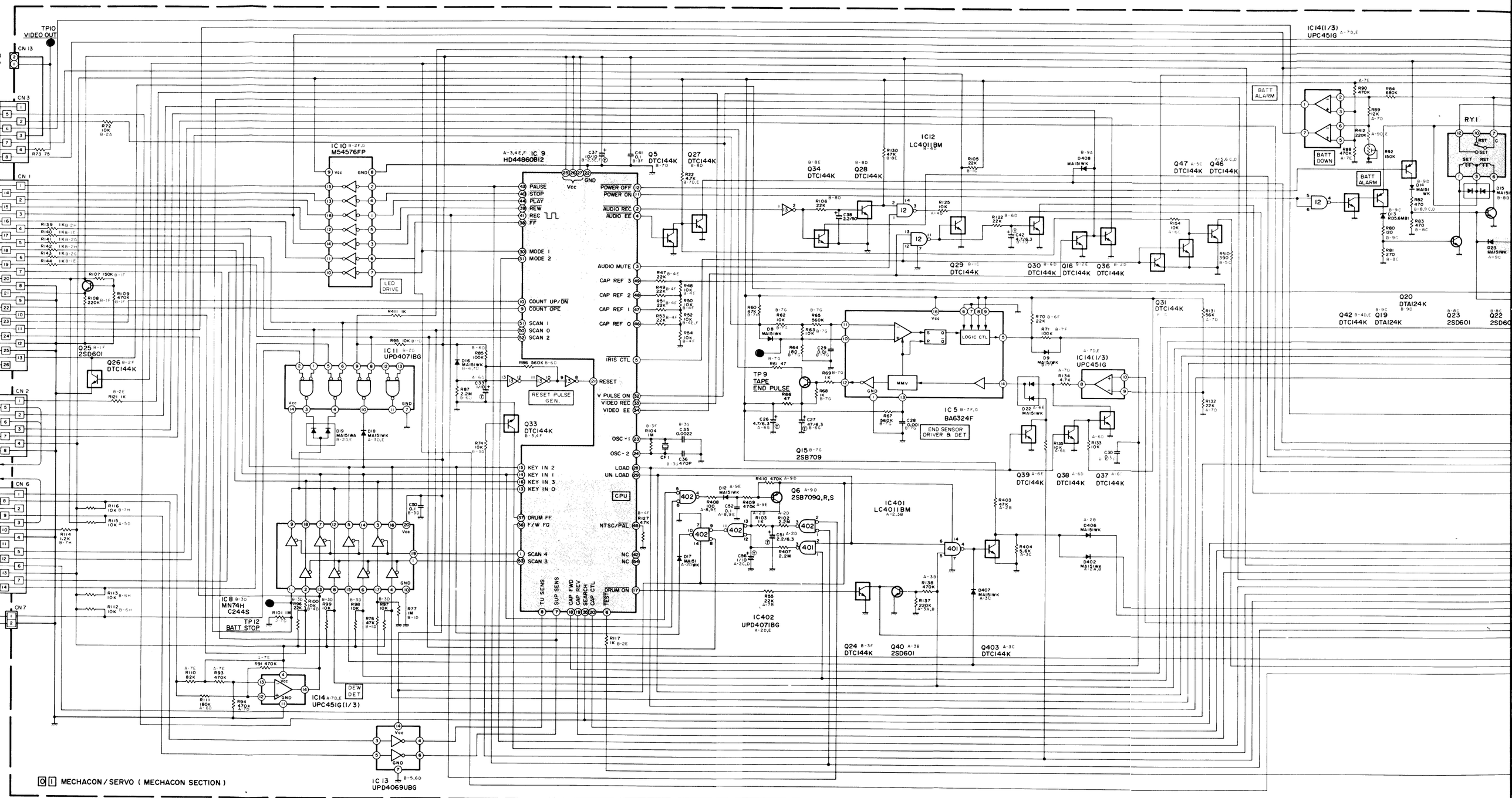
NOTES: Unless otherwise specified.

1. All resistance values are in ohms.
2. All inductance values are in H.
3. All capacitance values are in μF.
   : Chip capacitor
   : Electrolytic capacitor
   : Non-polar capacitor
   : Tantalum capacitor
   : Polypropylene capacitor
   : Mylar capacitor
4. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.
5. The digital transistor is a transistor that includes built in resistors. Both PNP and NPN transistors are available.

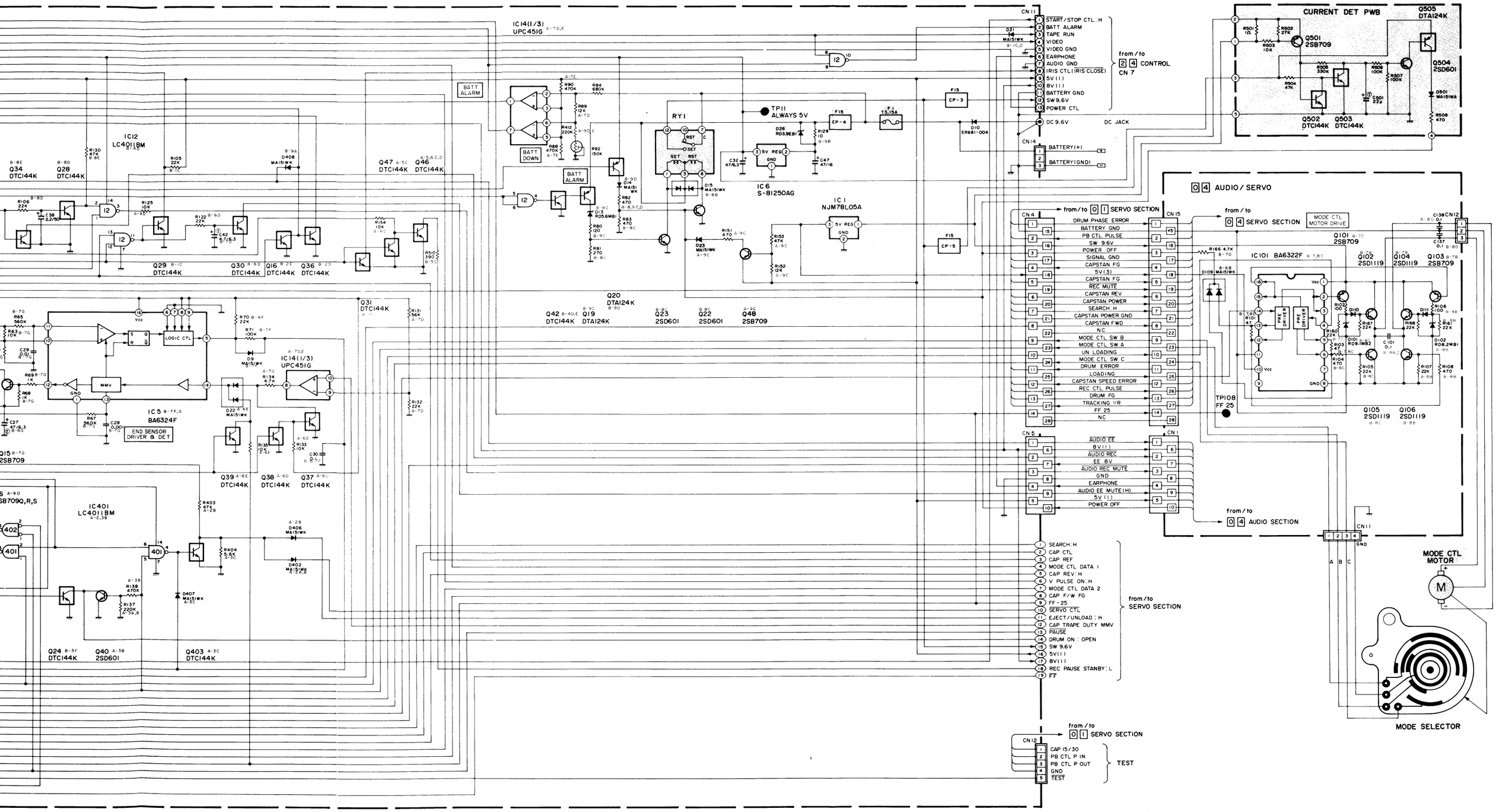


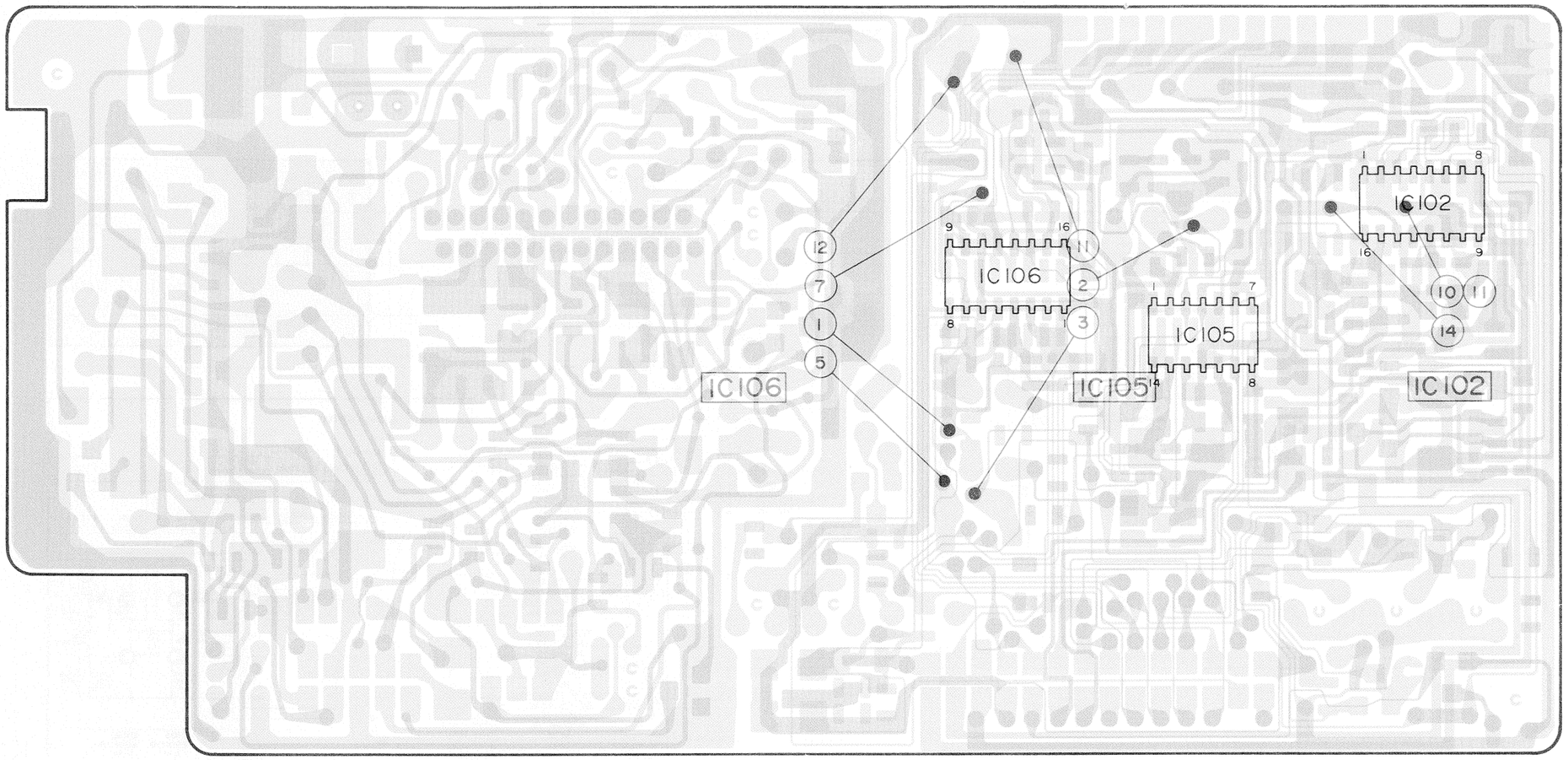
Hinweis:
Bauteile in den schattierten Flächen sind Sicherheitsbauteile! Nur gegen Original-Ersatzteile wechseln!




TP10 VIDEO OUT
CN 13
CN 3
CN 1
CN 2
CN 6
CN 7
IC10 M54576FP
IC 9 HD44860812
IC11 UPD4071BG
IC8 MN74H C244S
IC14 UPC451G(1/3)
IC13 UPD4069UBG
IC12 LC4011BM
IC14(1/3) UPC451G
IC 5 BA6324F
IC401 LC4011BM
IC402 UPD4071BG
LED DRIVE
RESET PULSE GEN.
DEW DET
CPU
TP12 BATT STOP
TP9 TAPE END PULSE
END SENSOR DRIVER & DET
BATT ALARM
BATT DOWN
LOGIC CTL
MMV
RY1
Q25 2SD601
Q26 DTC144K
Q5 DTC144K
Q27 DTC144K
Q33 DTC144K
Q34 DTC144K
Q28 DTC144K
Q29 DTC144K
Q30 DTC144K
Q16 DTC144K
Q36 DTC144K
Q47 DTC144K
Q46 DTC144K
Q20 DTA124K
Q42 DTC144K
Q19 DTA124K
Q23 2SD601
Q22 2SD601
Q31 DTC144K
Q39 DTC144K
Q38 DTC144K
Q37 DTC144K
Q15 2SB709
Q6 2SB709Q,R,S
Q24 DTC144K
Q40 2SD601
Q403 DTC144K
POWER OFF
POWER ON
AUDIO REC
AUDIO EE
AUDIO MUTE
CAP REF 3
CAP REF 2
CAP REF 1
CAP REF 0
IRIS CTL
RESET
V PULSE ON
VIDEO REC
VIDEO EE
OSC-1
OSC-2
LOAD
UN LOAD
DRUM FF
F/W FG
NTSC/PAL
NC
NC
DRUM ON
TEST
PAUSE
STOP
PLAY
REW
REC
FF
MODE 1
MODE 2
COUNT UP/DN
COUNT OPE
SCAN 1
SCAN 0
SCAN 2
KEY IN 2
KEY IN 1
KEY IN 3
KEY IN 0
SCAN 4
SCAN 3
TU SENS
SUP SENS
CAP FWD
CAP REV
SEARCH
CAP CTL
Vcc
GND
SET
RST
MECHACON / SERVO (MECHACON SECTION)

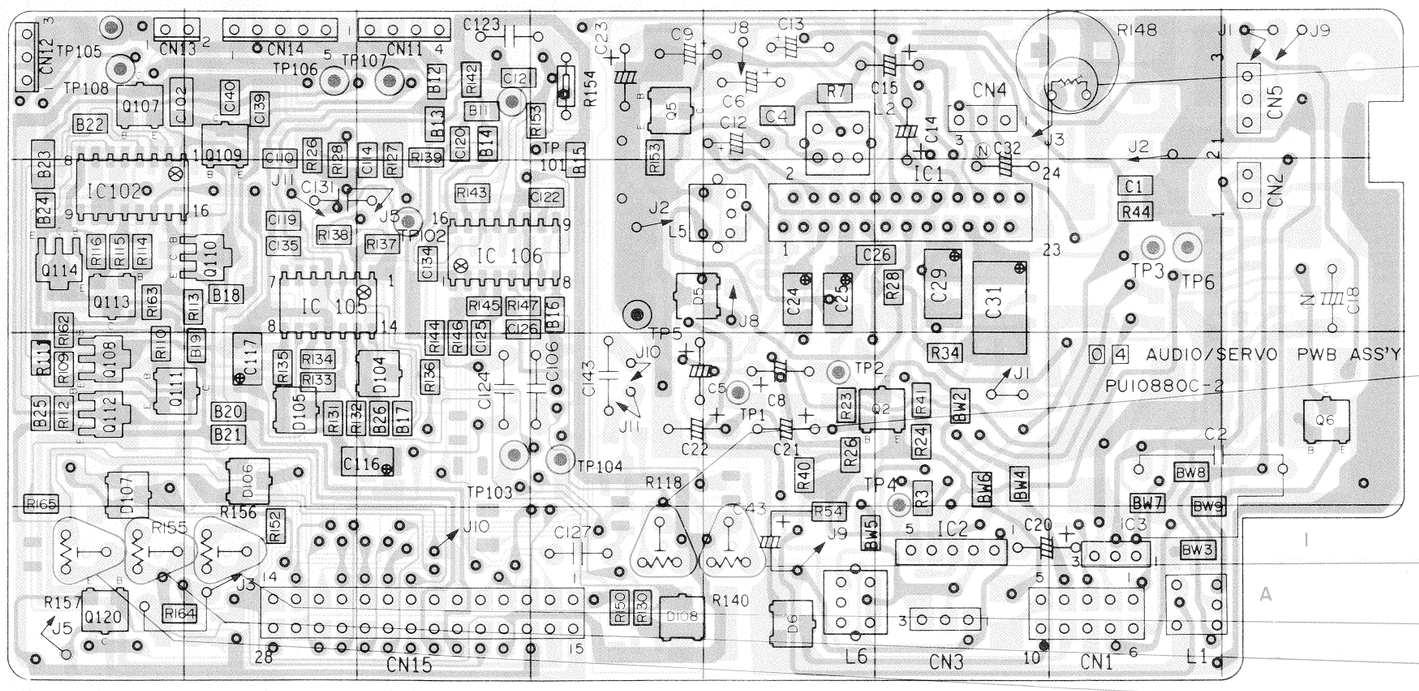
Mechaniksteuerung Schaltbild
Mechacon circuit diagram

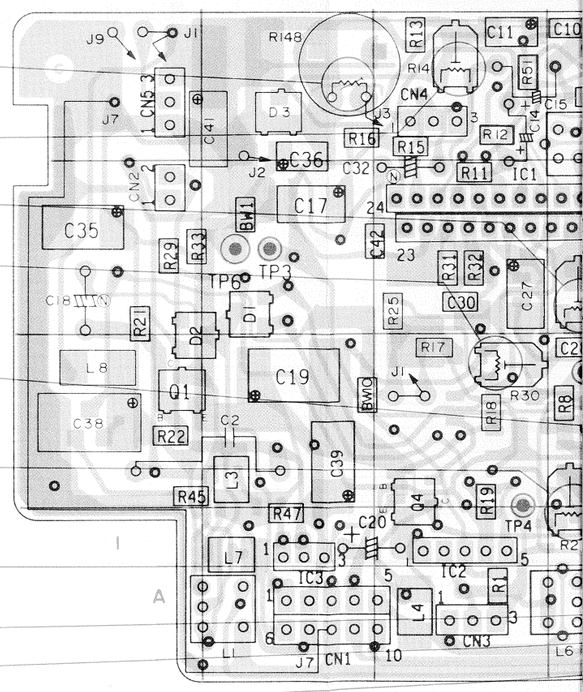




0 4 (Audio)-Servoplatte (IC-Anschlüsse)
(Audio)-Servo PWB (IC-pin tocation)

0 4 (Audio)-Servoplatte
(Audio)-Servo PWB

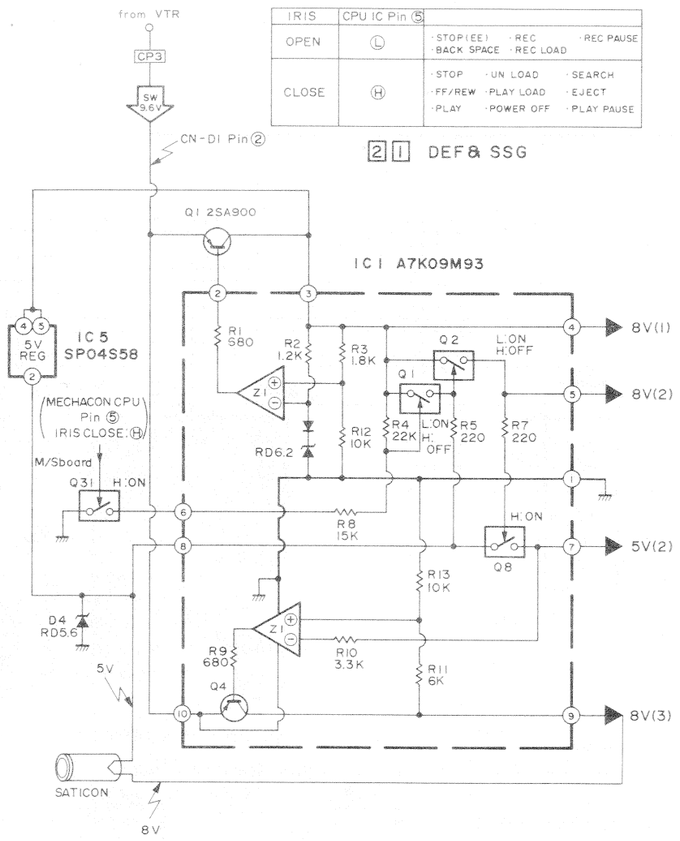




R148 TRACKING VR
R14 EE LEVEL
R27 REC LEVEL
R30 PB LEVEL
RI18 CAPSTAN SAMPLE POSITION
R2 BIAS LEVEL
RI40 DRUM SAMPLE POSITION
RI56 SEARCH FF PHASE
RI55 SEARCH REW PHASE
RI57 TRACKING PRESET

)-Servoplatte (IC-Anschlüsse)
)-Servo PWB (IC-pin tocation)

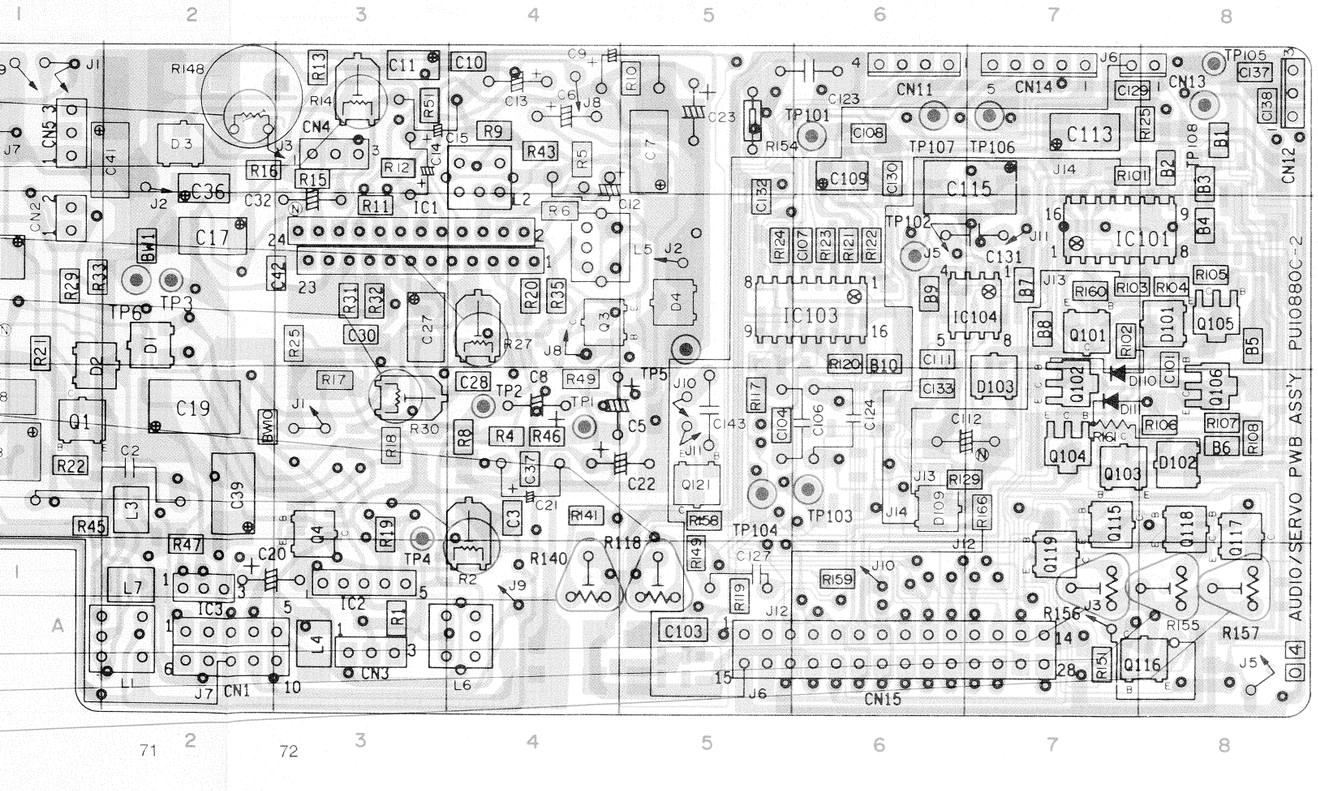
Funktion IC 1 (Ablenkplatte)
Function IC 1 (Def + SSG PWB)

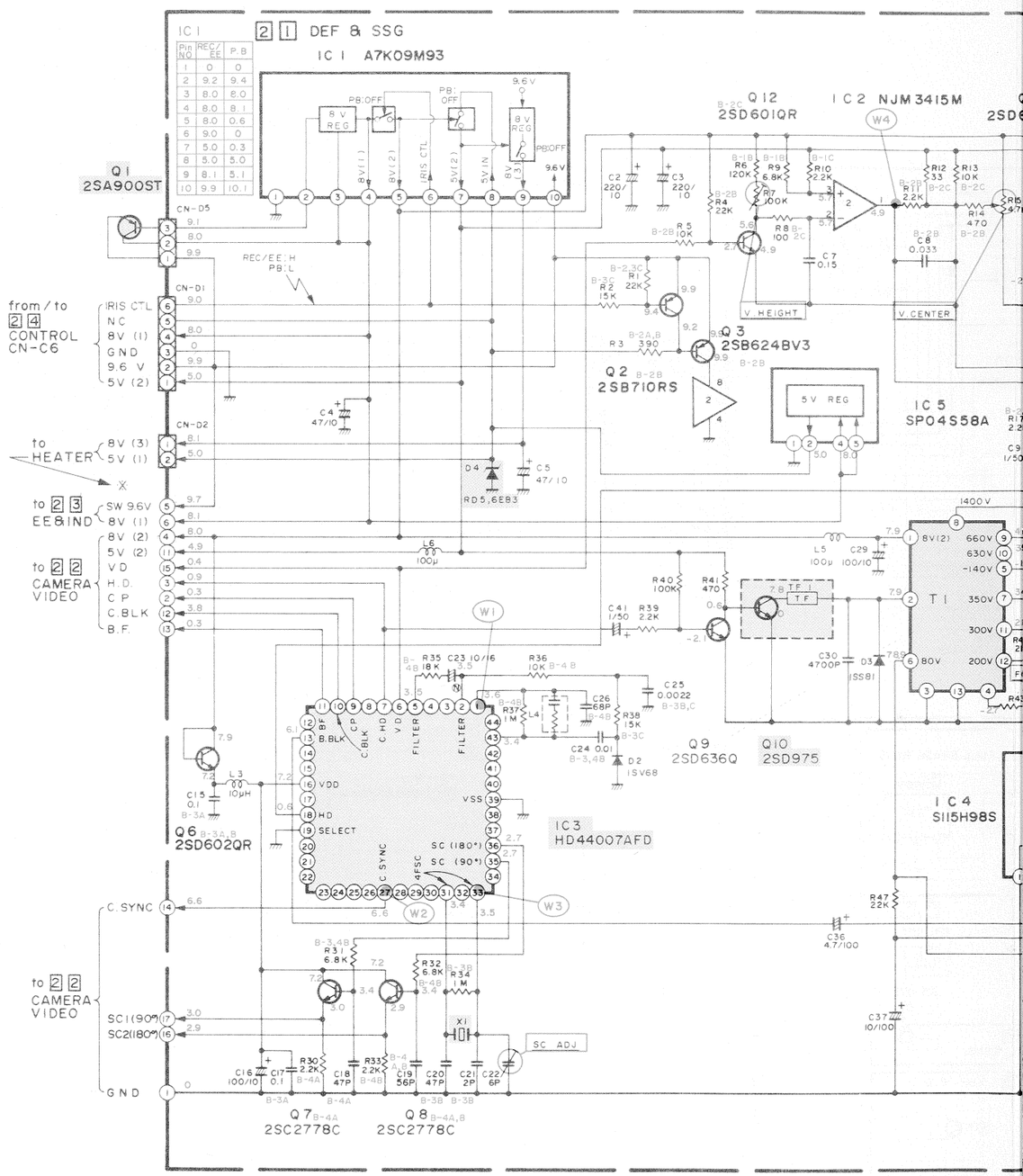


IRIS	CPU IC Pin ⑤	
OPEN	Ⓛ	·STOP(EE) ·REC ·REC PAUSE ·BACK SPACE ·REC LOAD
CLOSE	Ⓗ	·STOP ·UN LOAD ·SEARCH ·FF/REW ·PLAY LOAD ·EJECT ·PLAY ·POWER OFF ·PLAY PAUSE

2 1 DEF & SSG

(Audio)-Servoplatte
(Audio)-Servo PWB





Pin NO.	REC/EE	P.B
1	0	0
2	9.2	9.4
3	8.0	8.0
4	8.0	8.1
5	8.0	0.6
6	9.0	0
7	5.0	0.3
8	5.0	5.0
9	8.1	5.1
10	9.9	10.1

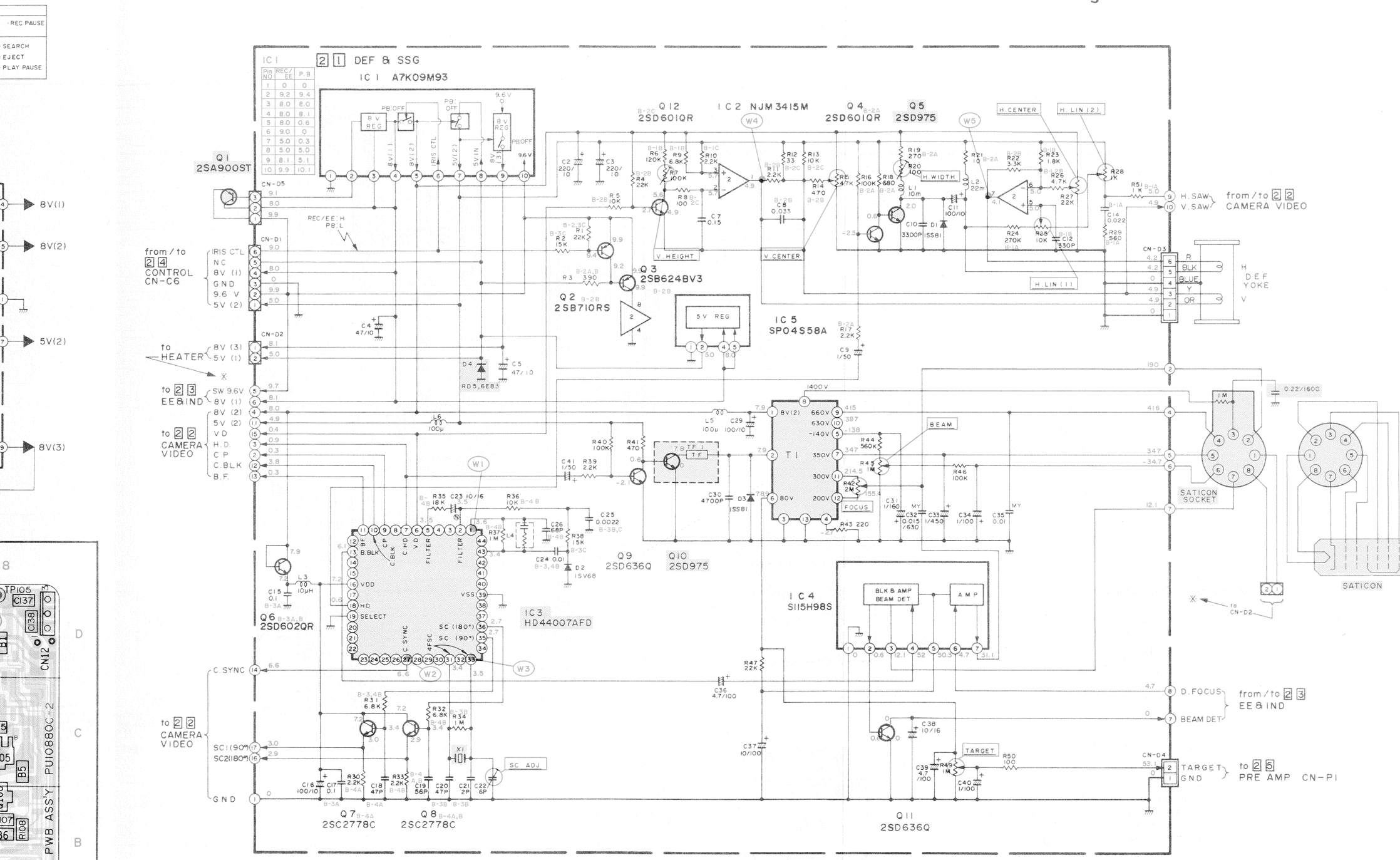
NOTES:

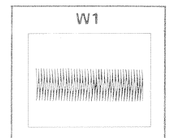
1. ▨ parts are importantly related to safety.
   When replacing them, make sure to use specified parts.
2. Voltage and waveform measurements.
   Voltage: Measured with digital voltmeter in DC range at iris closed.
   Waveform: With greyscale completely filling the picture area at auto-iris.

Hinweis:

1. Alle Gleichspannungen sind mit e
   gemessen, bei geschlossener Bl
2. Oszillogramme: Grautreppe, Bler
3. Bauteile in schraffierten Flächen
   Bauteile! Nur gegen Original-Ersa

2 1 Ablenkplatte Schaltbild
DEF + SSG circuit diagram





NOTES:

1. parts are importantly related to safety.
   When replacing them, make sure to use specified parts.
2. Voltage and waveform measurements.
   Voltage: Measured with digital voltmeter in DC range at iris closed.
   Waveform: With greyscale completely filling the picture area at auto-iris.

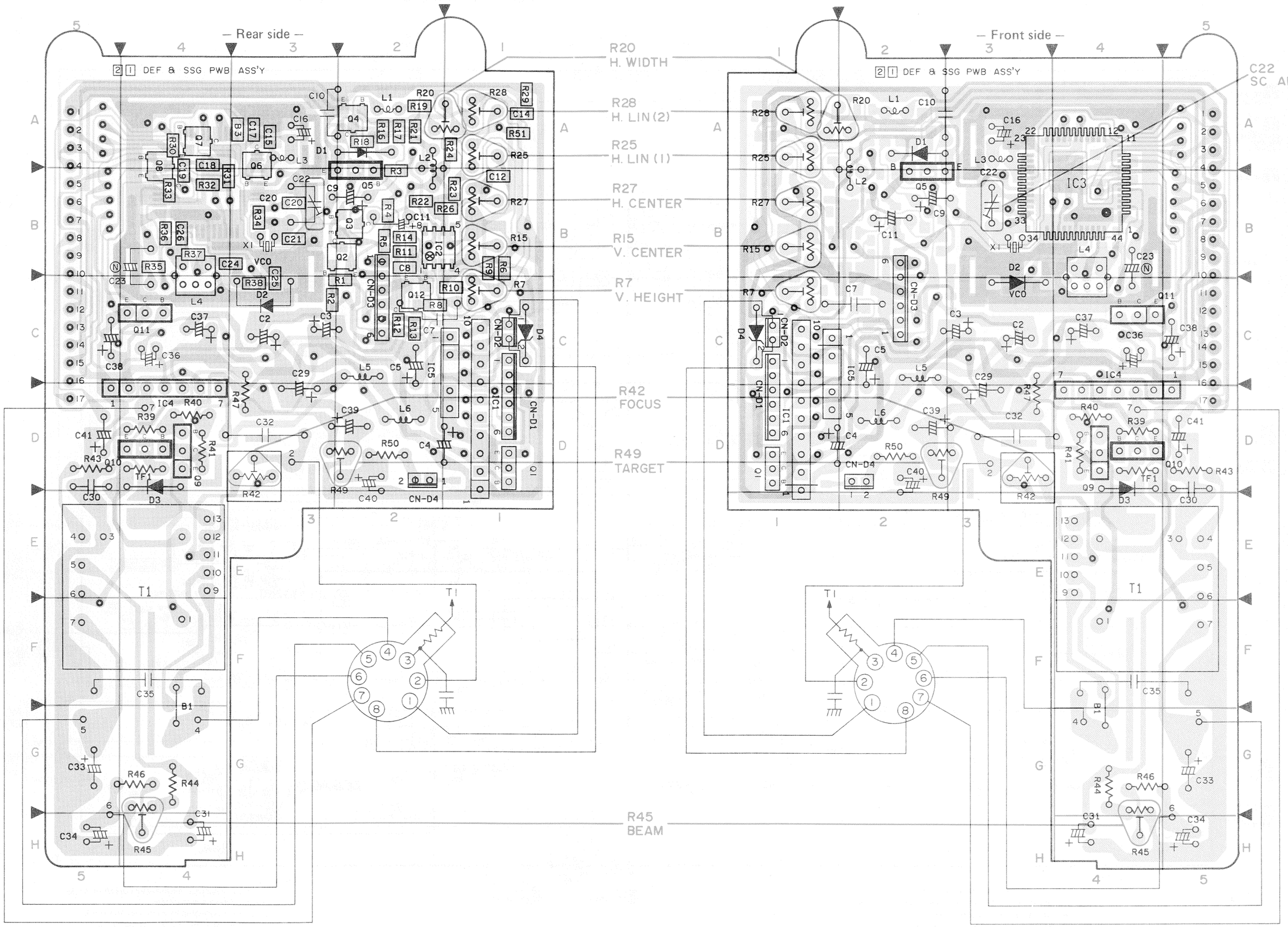
Hinweis:

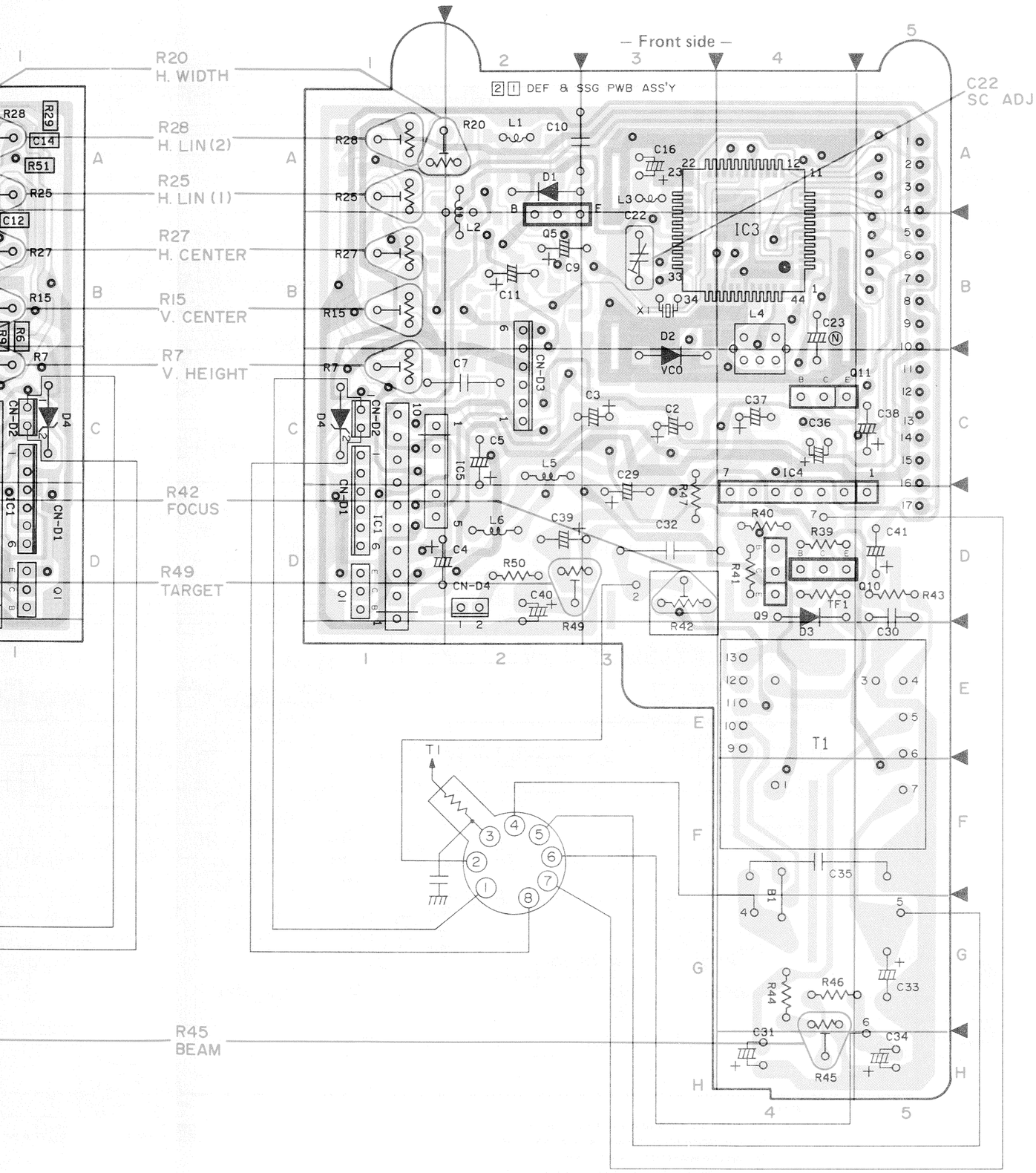
1. Alle Gleichspannungen sind mit einem Digital-Voltmeter gemessen, bei geschlossener Blende.
2. Oszillogramme: Grautreppe, Blende auf Automatik.
3. Bauteile in schraffierten Flächen sind Sicherheits-Bauteile! Nur gegen Original-Ersatzteile wechseln!

NOTES: Unless otherwise specified.

1. All resistance values are in ohms.
2. All inductance values are in H.
3. All capacitance values are in μF.

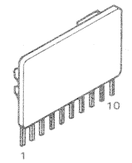
: Chip capacitor
: Electrolytic capacitor
: Tantalum capacitor
MY : Mylar capacitor
NP : Non-polar capacitor
P.PI : Polypropylene capacitor


— Rear side —
2 1 DEF & SSG PWB ASS'Y
R20
H. WIDTH
R28
H. LIN (2)
R25
H. LIN (1)
R27
H. CENTER
R15
V. CENTER
R7
V. HEIGHT
R42
FOCUS
R49
TARGET
R45
BEAM
— Front side —
2 1 DEF & SSG PWB ASS'Y
C22
SC ADJ
IC3
T1
IC4
IC5
CN-D1
CN-D2
CN-D3
CN-D4
VCO
TF1

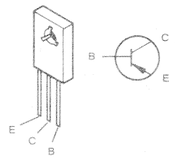


2 1 Ablenkplatte
DEF + SSG PWB

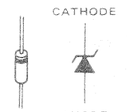
A7K09M93



2SA900ST



RD5.6EB3



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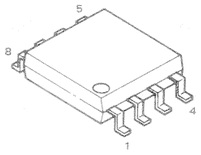
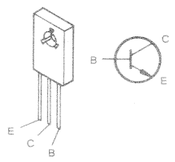
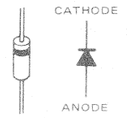


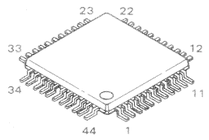
2SD975



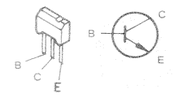
1SV68



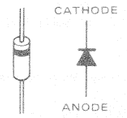
HD44007AFD



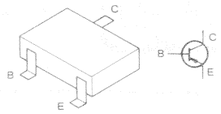
2SD636Q



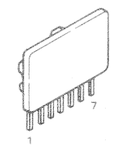
1SS81



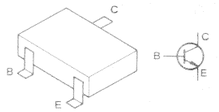
2SB624BV3
2SB710RS



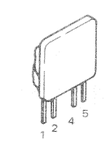
S115H98S

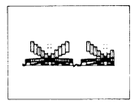
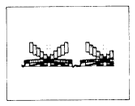
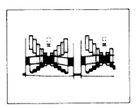
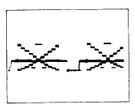
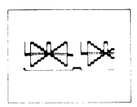
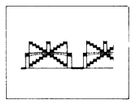
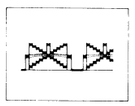
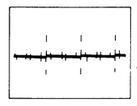
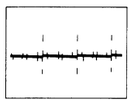
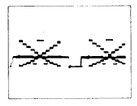
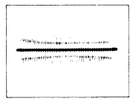
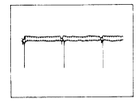
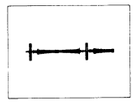
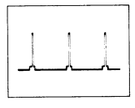


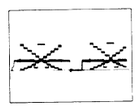
2SC2778C
2SD601QR
2SD602QR

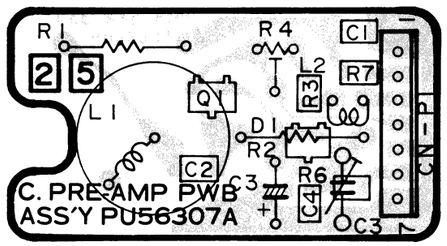


SP04S58A

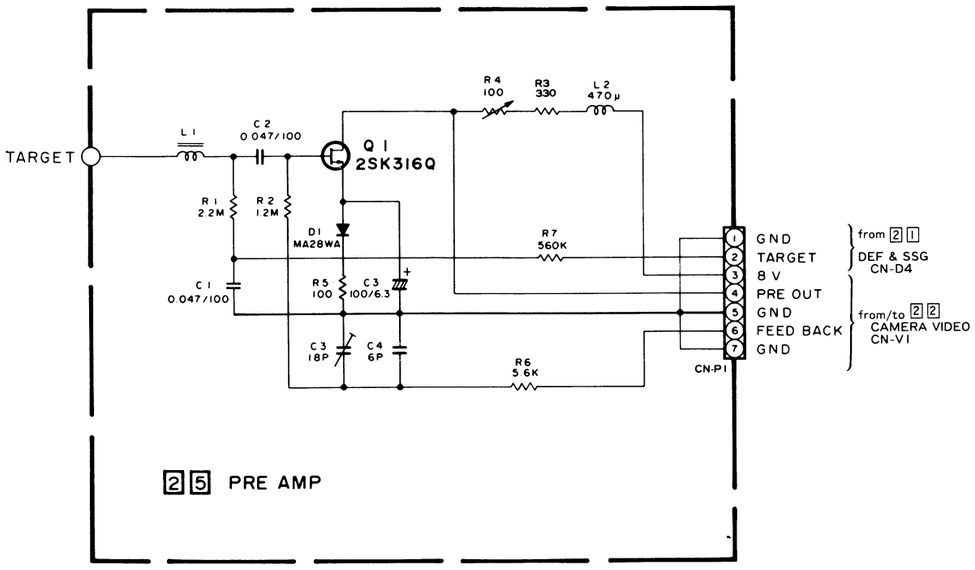


W1	W2	W3	W4	W5	W6
					
TP1 0.3 Vp-p (H)	IC2 ⑤ 0.3 Vp-p (H)	IC2 ⑥ 0.7 Vp-p (H)	IC2 ⑬ 0.95 Vp-p (H)	IC2 ⑧ 0.75 Vp-p (H)	TP2 0.65 Vp-p (H)
W7	**W8**	**W9**	**W10**	**W11**	**W12**
					
IC5 ⑮ 0.5 Vp-p (H)	IC5 ⑱ 1.5 Vp-p (H)	TP8 1.0 Vp-p (H)	TP7 0.34 Vp-p	IC3 ㉔ 0.7 Vp-p (V)	IC3 ⑲ 0.4 Vp-p (H)
W13	**W14**	**W15**	**W16**	**W17**	**W18**
					
TP 3 0.1 Vp-p (V) Note: White pattern	IC3 ⑪ 0.08 Vp-p (V) Note: White pattern	IC4 ㉔ 0.1 Vp-p(V) Note: White pattern	TP5, TP6 (V) Note: White pattern	TP9 0.2 Vp-p (H) Note: White pattern	② 6.5 p-p

W19

C41 ⊕SIDE 0.7 Vp-p

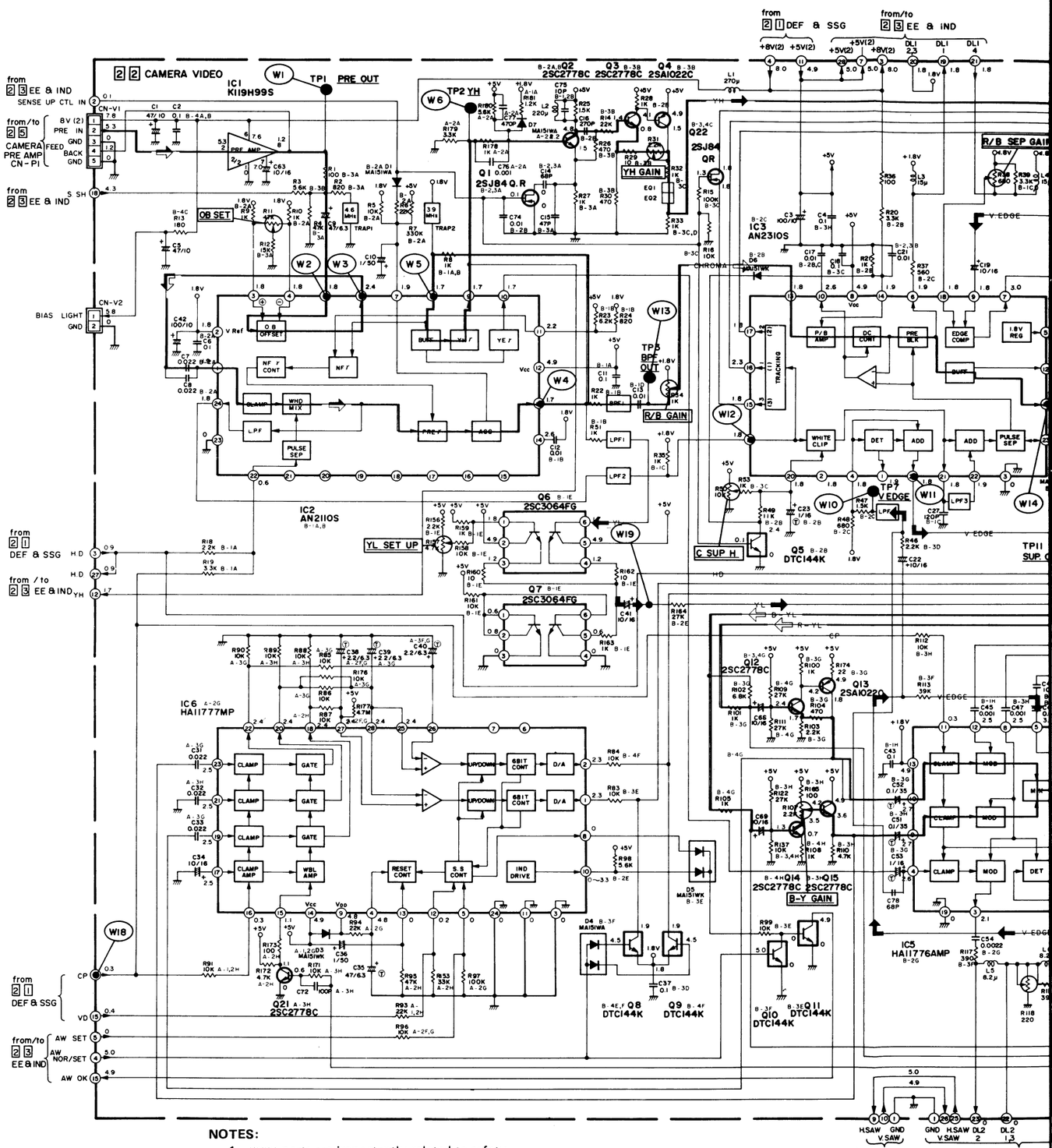


2 5 Vorverstärker Preamplifier



NOTES: Camera amp R4 and C3 are adjusted at the factery.
Replace the entire camera pre-amp ass'y as a unit.
Readjustment of R4 and C3 is not required, even after replacing the Saticon.

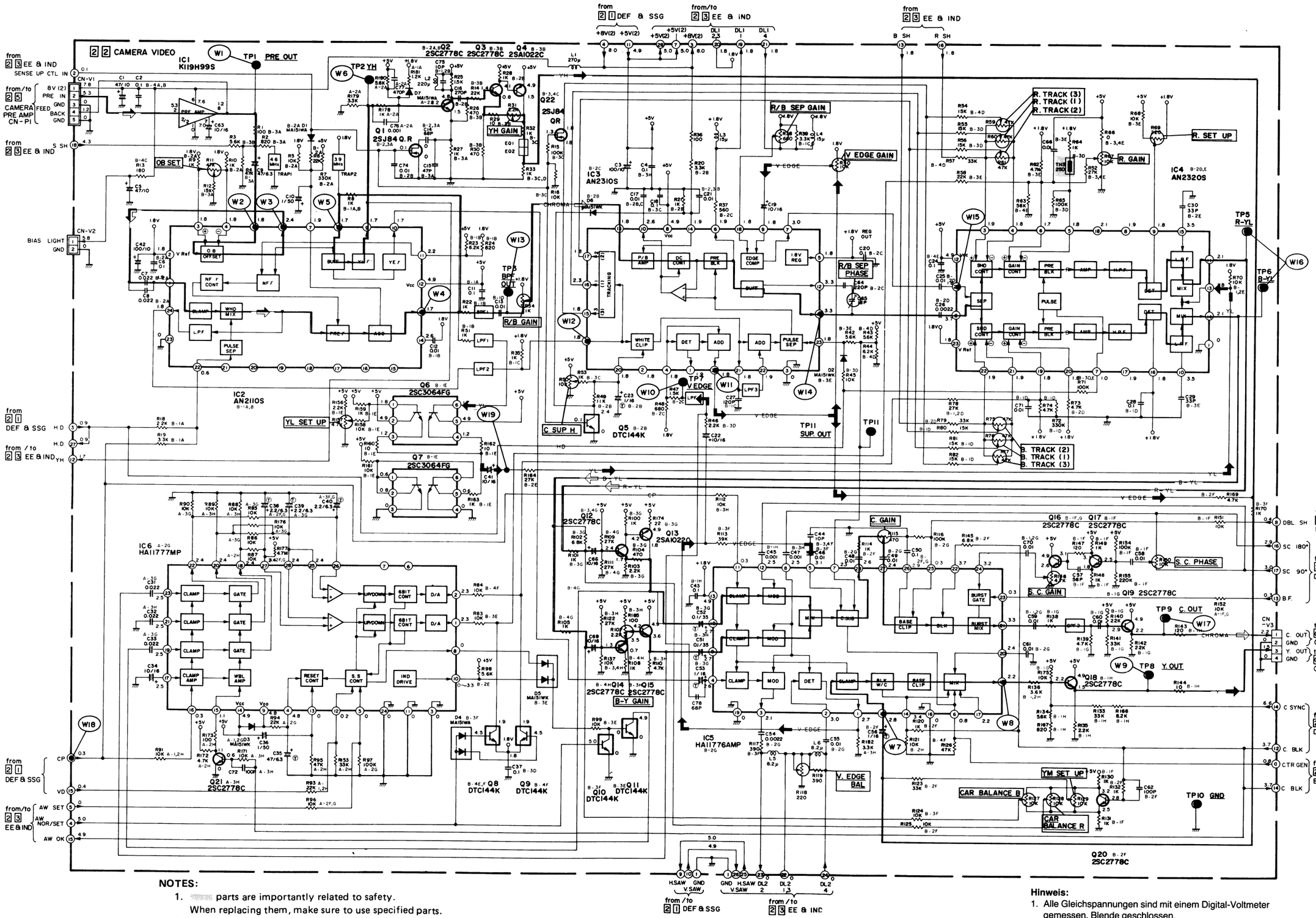
Hinweis:
R4 und C3 sind fest eingestellt.
Ein Abgleich ist nicht erforderlich.



NOTES:

1. ▨ parts are importantly related to safety.
   When replacing them, make sure to use specified parts.
2. Voltage and waveform measurements
   Voltage: Measured with digital voltmeter in DC range at iris closed
   Waveform: With greyscale completely filling the picture area at auto-iris

2 2 Videoplatte (Camera) Schaltbild
Video PWB (Camera) circuit diagram



NOTES:

1. ▨ parts are importantly related to safety.
   When replacing them, make sure to use specified parts.
2. Voltage and waveform measurements
   Voltage: Measured with digital voltmeter in DC range at iris closed
   Waveform: With greyscale completely filling the picture area at auto-iris

Hinweis:

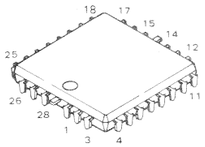
1. Alle Gleichspannungen sind mit einem Digital-Voltmeter gemessen. Blende geschlossen.
2. Oszillogramme: Grautreppe, Blende auf Automatik.
3. Bauteile in schattierten Flächen sind Sicherheitsbauteile! Nur gegen Original-Ersatzteile auswechseln!

2 3
E-E &
IND

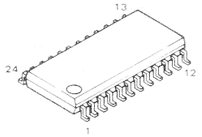
— Flexible board —

2 1
DEF &
SSG

HA1176MP
HA11777MP



AN2110S
AN2310S
AN2320S



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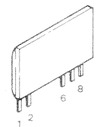

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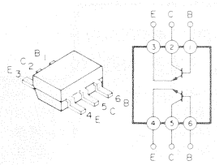

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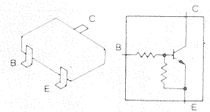

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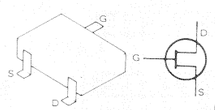

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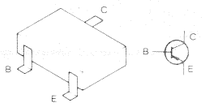

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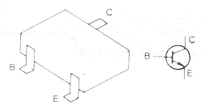
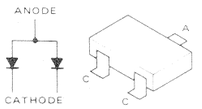


MA151WA



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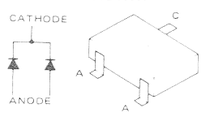
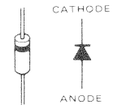
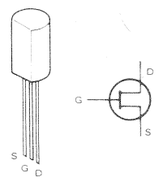


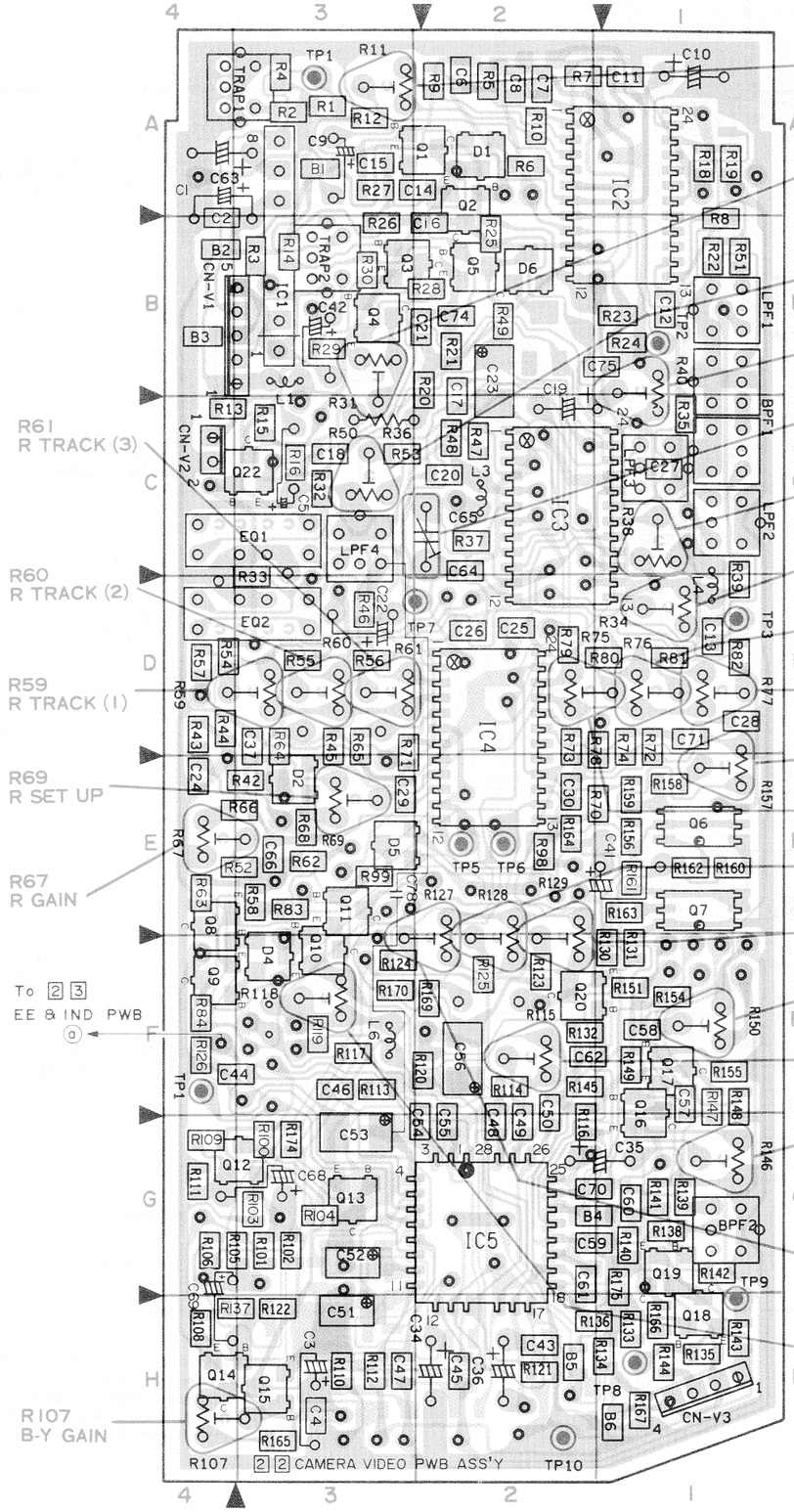
1SS133



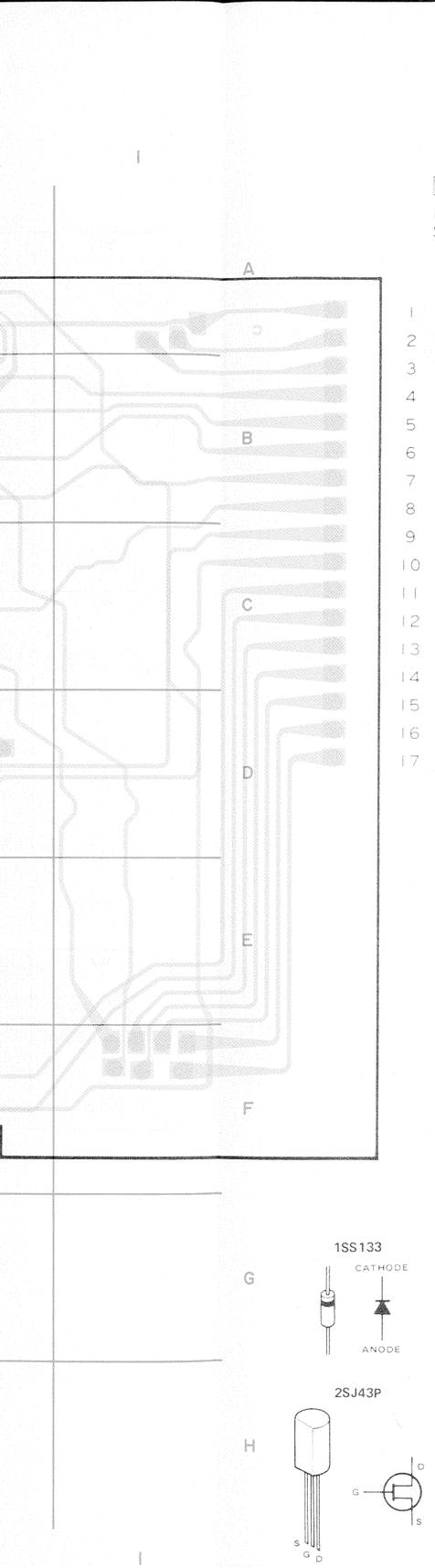
2SJ43P

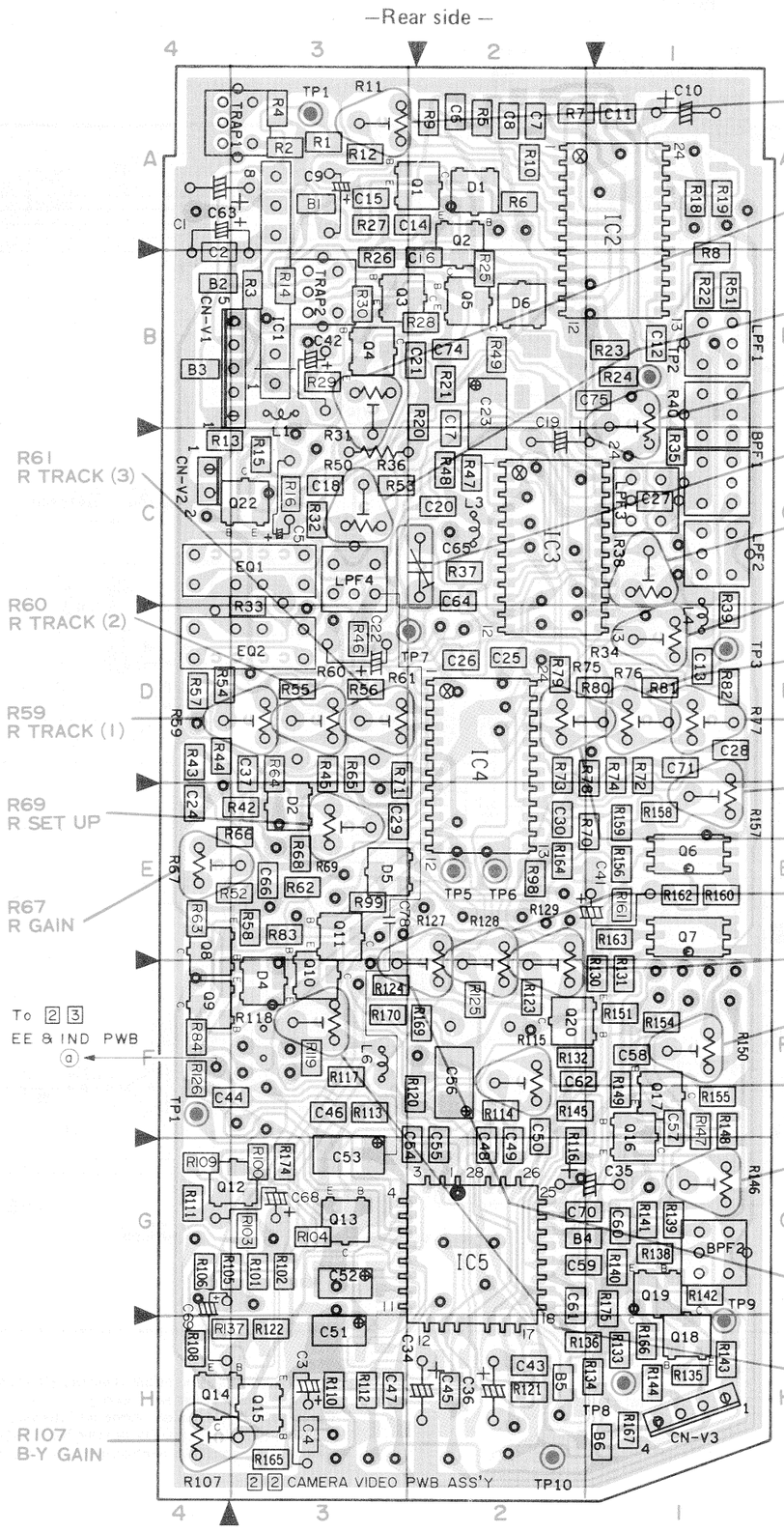


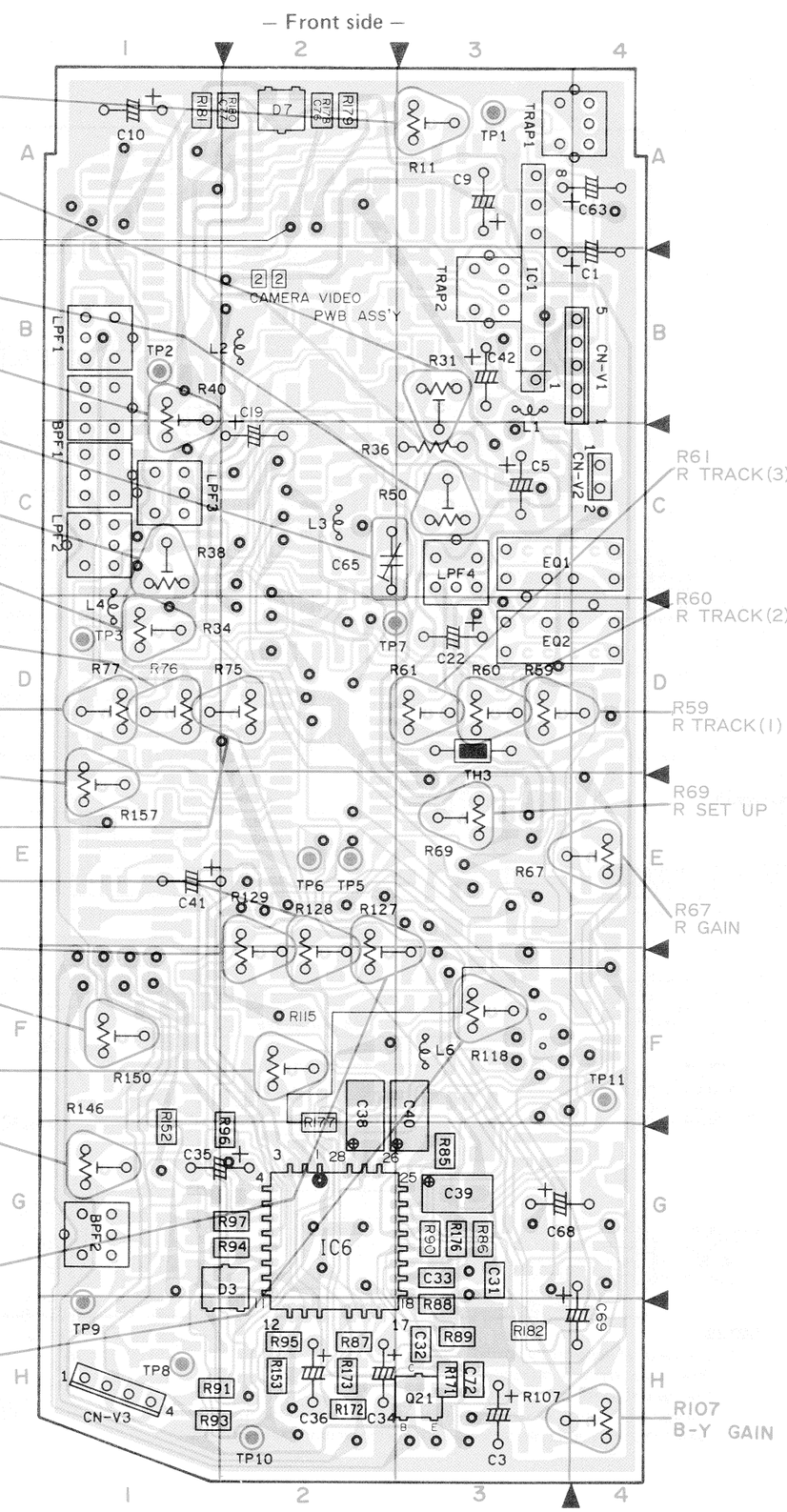
—Rear side —



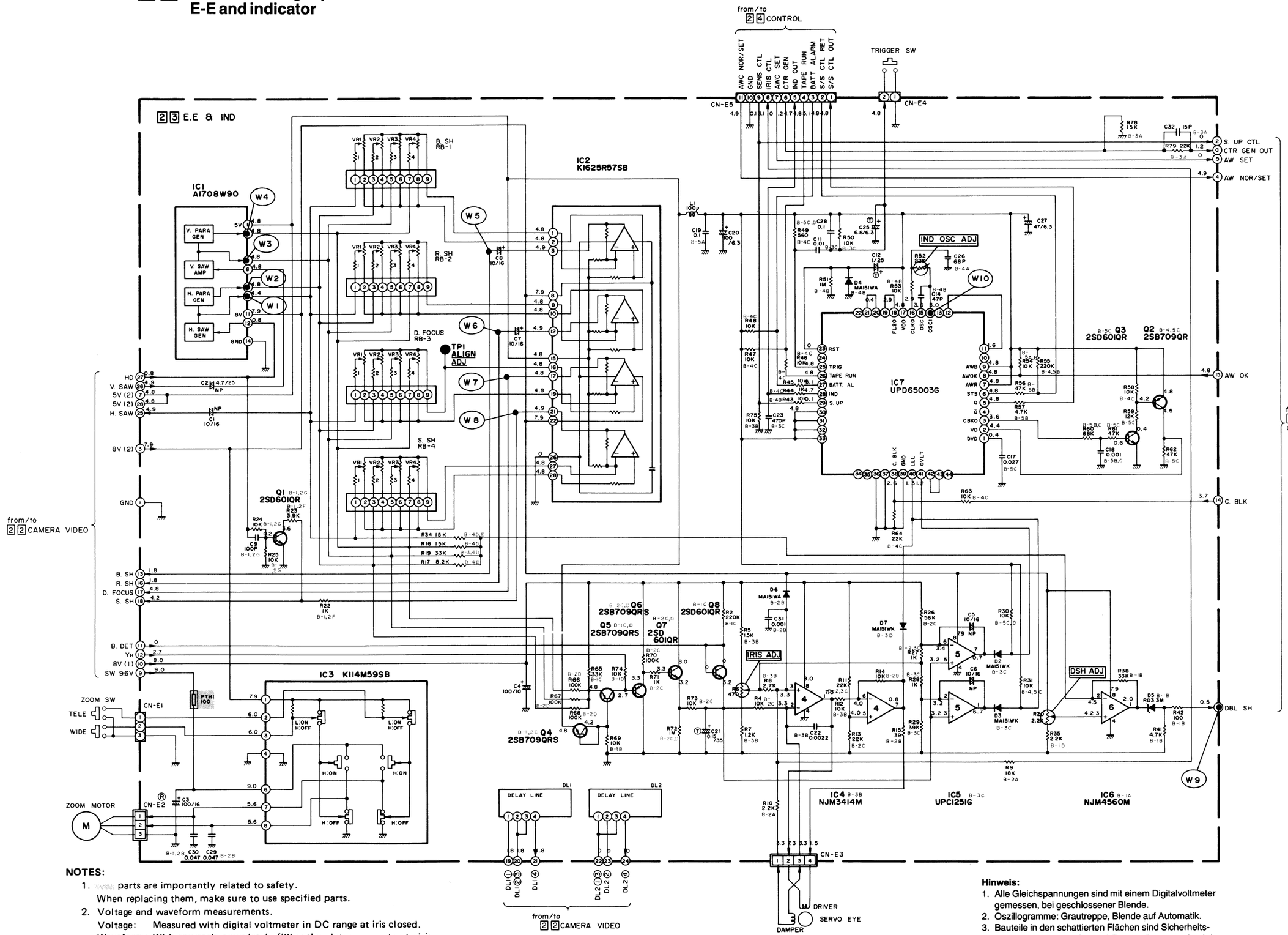
2 2 Videoplatte (Camera)
Video PWB (Camera)







2 3 E-E und Anzeigenplatte
E-E and indicator



NOTES:

1. ⚠ parts are importantly related to safety.
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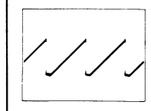
   Voltage: Measured with digital voltmeter in DC range at iris closed.
   Waveform: With greyscale completely filling the picture area at auto-iris.

Hinweis:

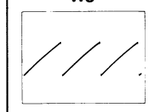
1. Alle Gleichspannungen sind mit einem Digitalvoltmeter gemessen, bei geschlossener Blende.
2. Oszillogramme: Grautreppe, Blende auf Automatik.
3. Bauteile in den schattierten Flächen sind Sicherheitsbauteile! Nur gegen Original-Ersatzteile auswechseln!

W1



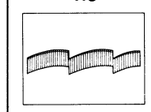
IC1 ⑨
2.7 Vp-p (H)

W3



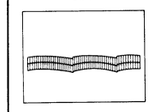
IC1 ⑤
2.8 Vp-p (V)

W5



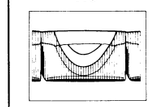
C8
⊖ SIDE

W7

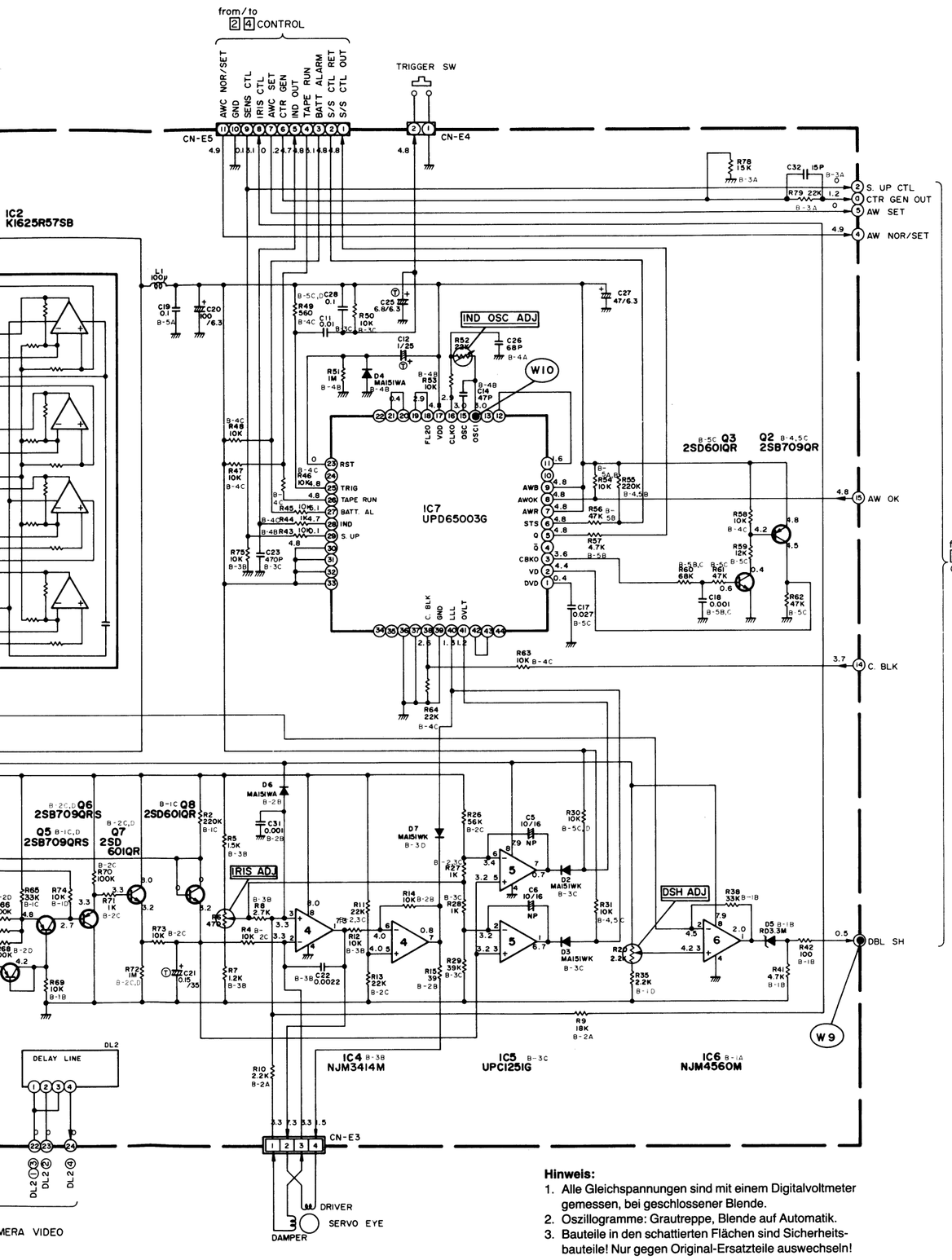


IC2 ⑰

W9



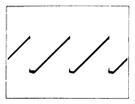
⑧
5.5 Vp-p (V)



Hinweis:

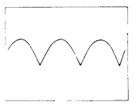
1. Alle Gleichspannungen sind mit einem Digitalvoltmeter gemessen, bei geschlossener Blende.
2. Oszillogramme: Grautreppe, Blende auf Automatik.
3. Bauteile in den schattierten Flächen sind Sicherheitsbauteile! Nur gegen Original-Ersatzteile auswechseln!

W1



IC1 (9)
2.7 Vp-p (H)

W2

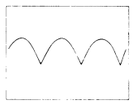


IC1 (8)
3.2 Vp-p (H)

W3

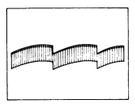
IC1 (5)
2.8 Vp-p (V)

W4



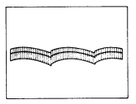
IC1 (2)
3.4 Vp-p (V)

W5



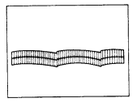
C8
⊖ SIDE

W6



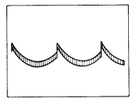
C7
⊖ SIDE

W7



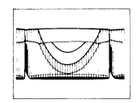
IC2 (17)

W8



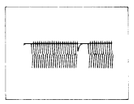
IC2 (21)

W9



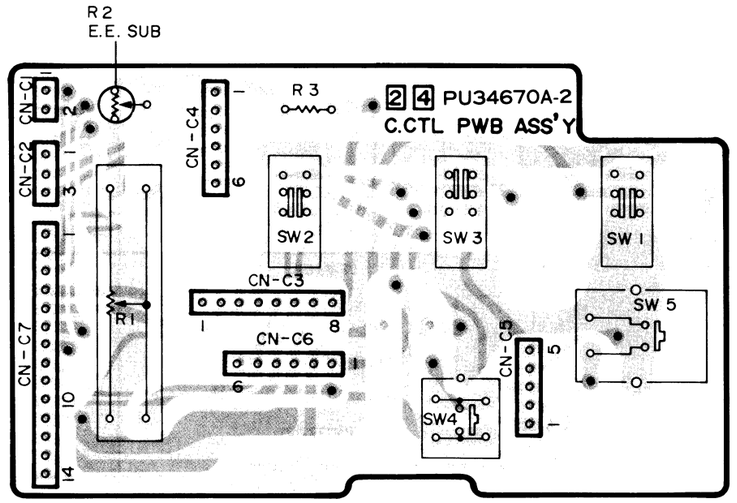
(8)
5.5 Vp-p (V)

W10

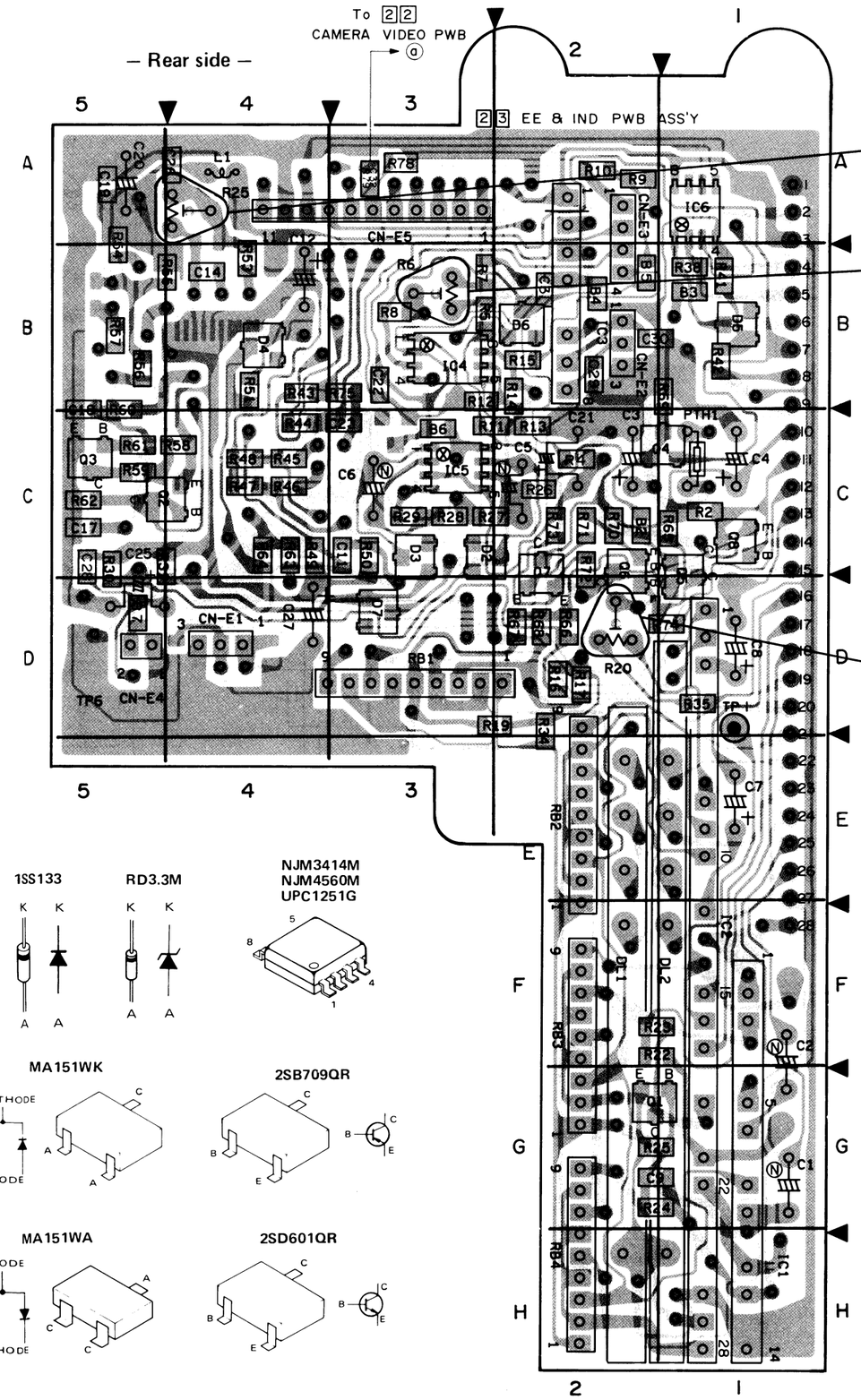


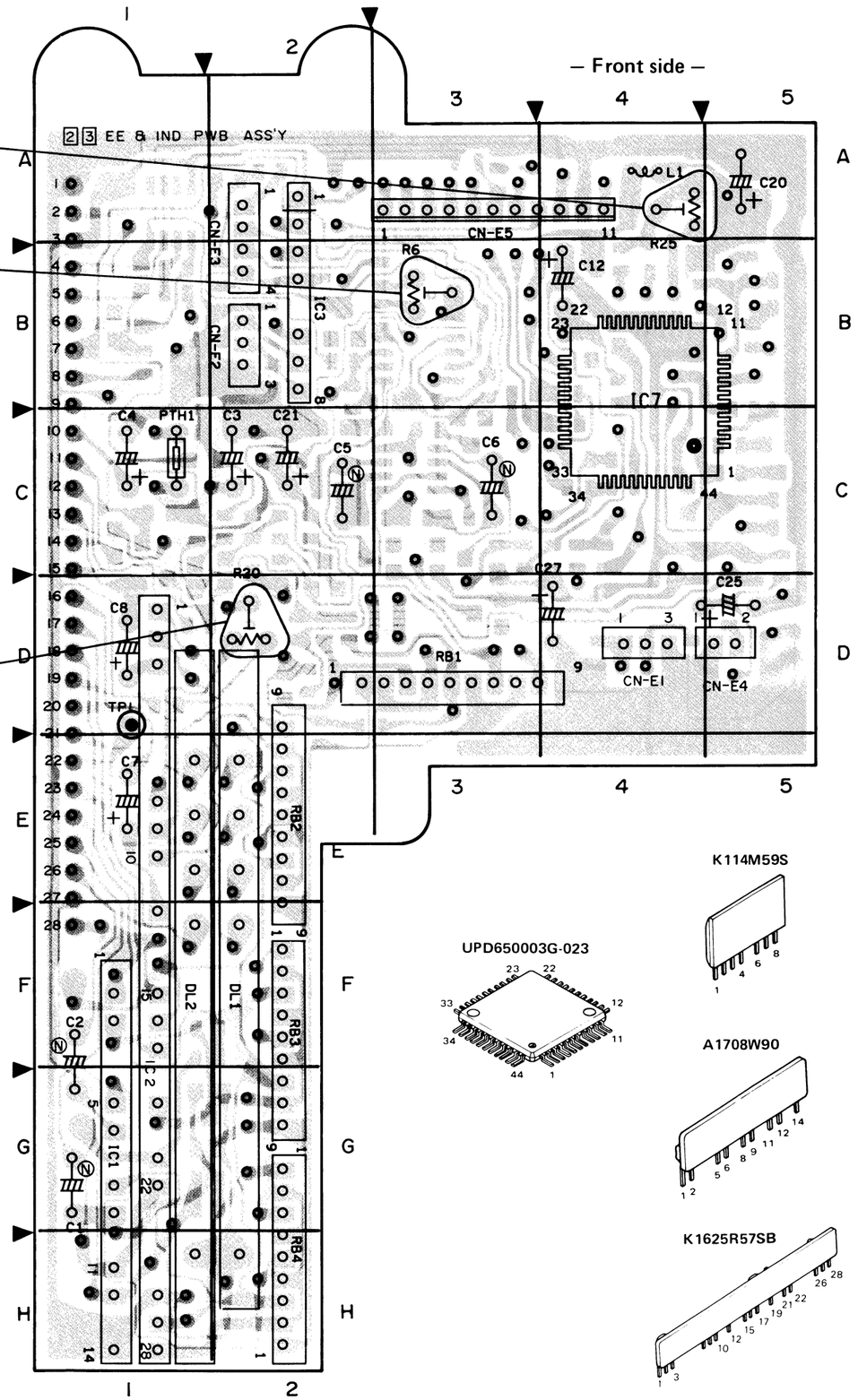
IC7 (14)
6.4 Vp-p (H)

2 4 Camera Schalterplatte
Camera control PWB



2 3 E-E und Anzeigeplatte
E-E and indicator PWB



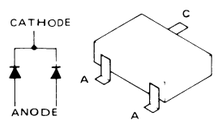


1SS133

RD3.3M

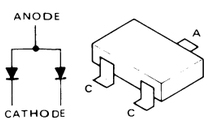
NJM3414M
NJM4560M
UPC1251G

MA151WK



2SB709QR

MA151WA



2SD601QR

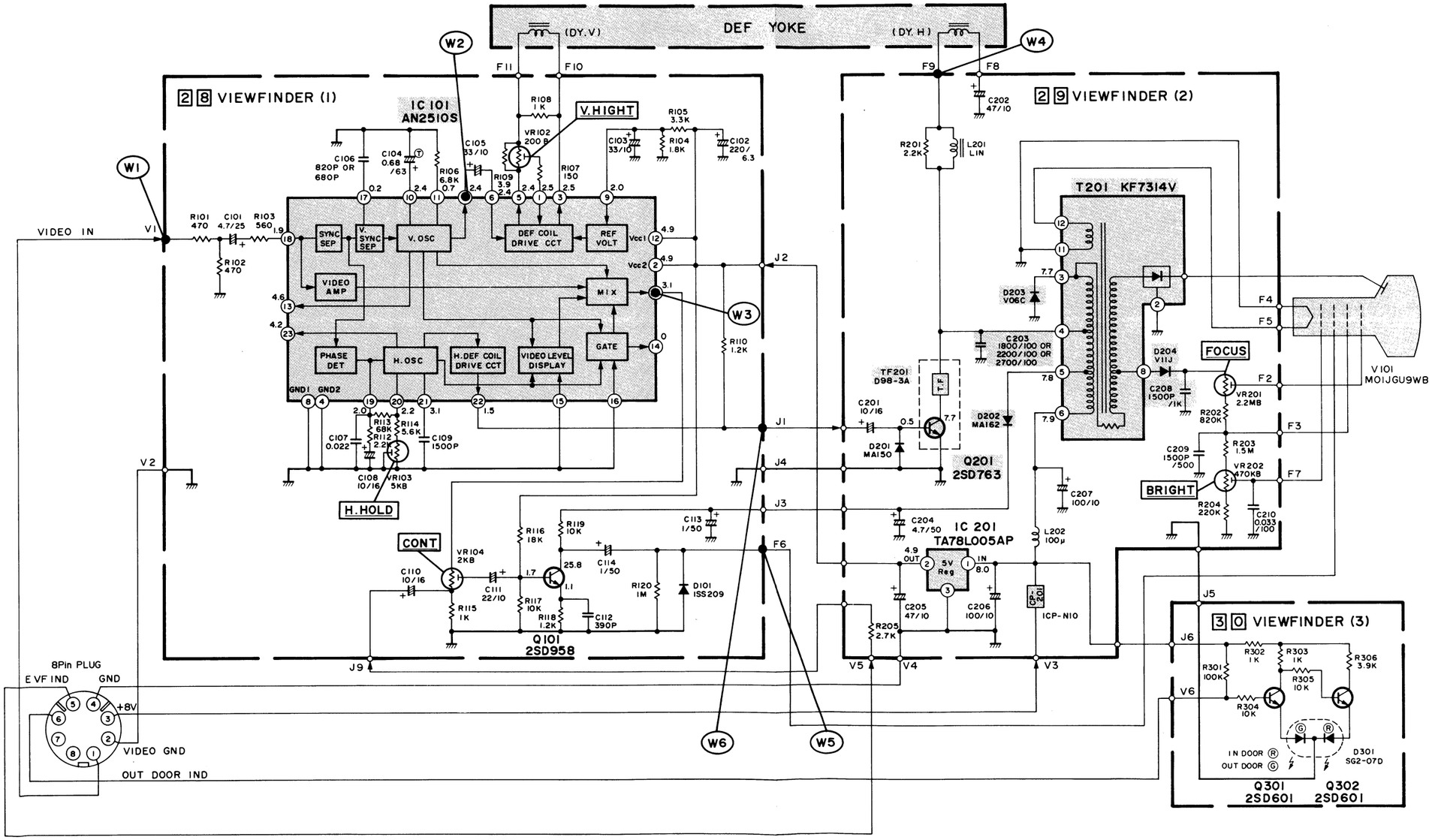
UPD650003G-023

K114M59S

A1708W90

K1625R57SB

28, 29, 30 elektron. Sucher
Viewfinder



W1
V1
2.0 Vp-p

W2
IC101 (7)
3.0 Vp-p

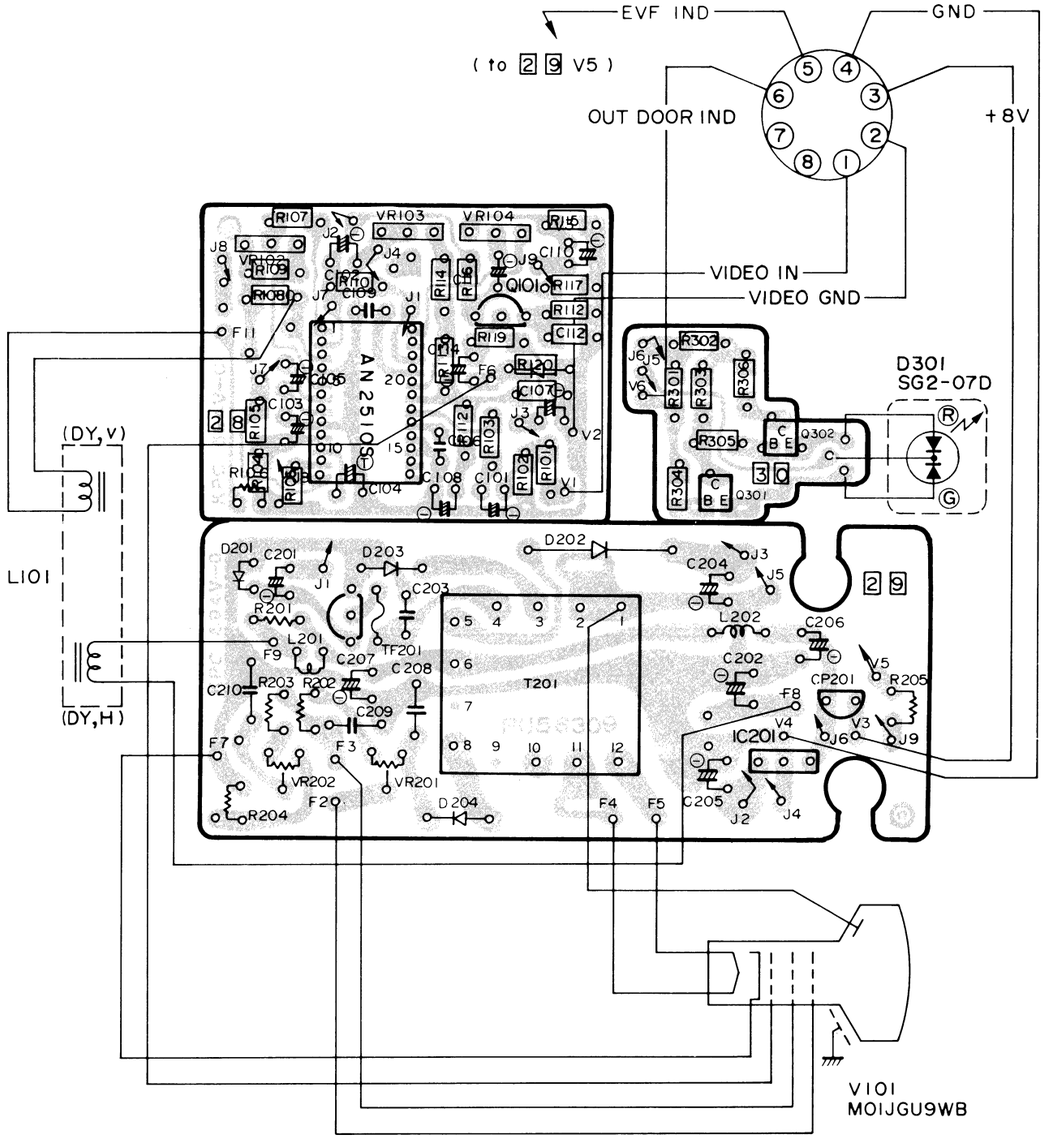
W3
IC101 (24)
3.0 Vp-p

W4
F9
68 Vp-p

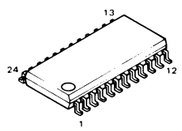
W5
F6
17 Vp-p

W6
J1
2.0 Vp-p

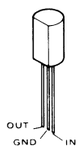
28, 29, 30 elektron. Sucher
Viewfinder



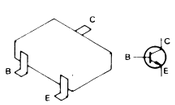
AN2510S



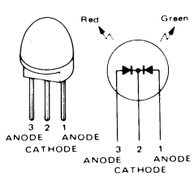
TA78L005AP



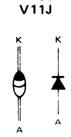
2SD601



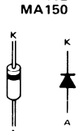
SG2-07D



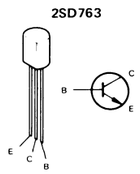
V06C
V11J



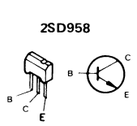
1SS209
MA162
MA150



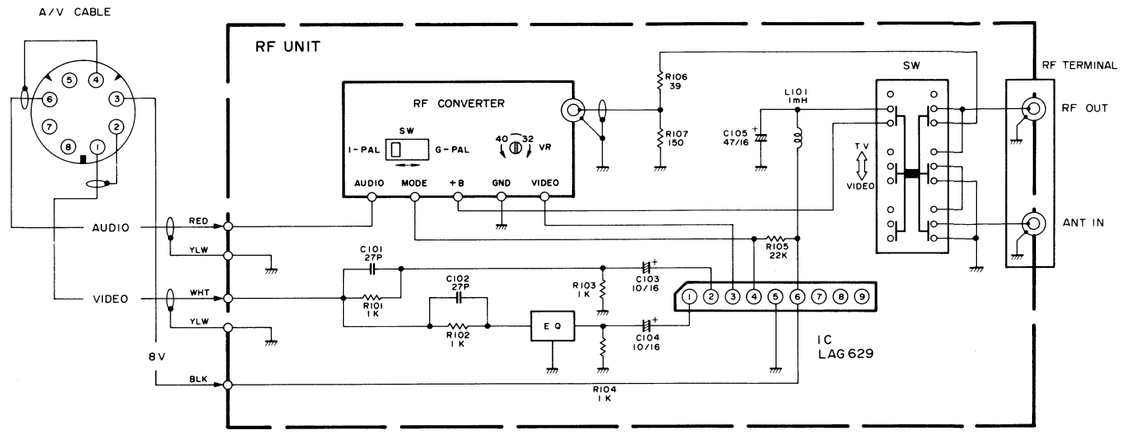
2SD763

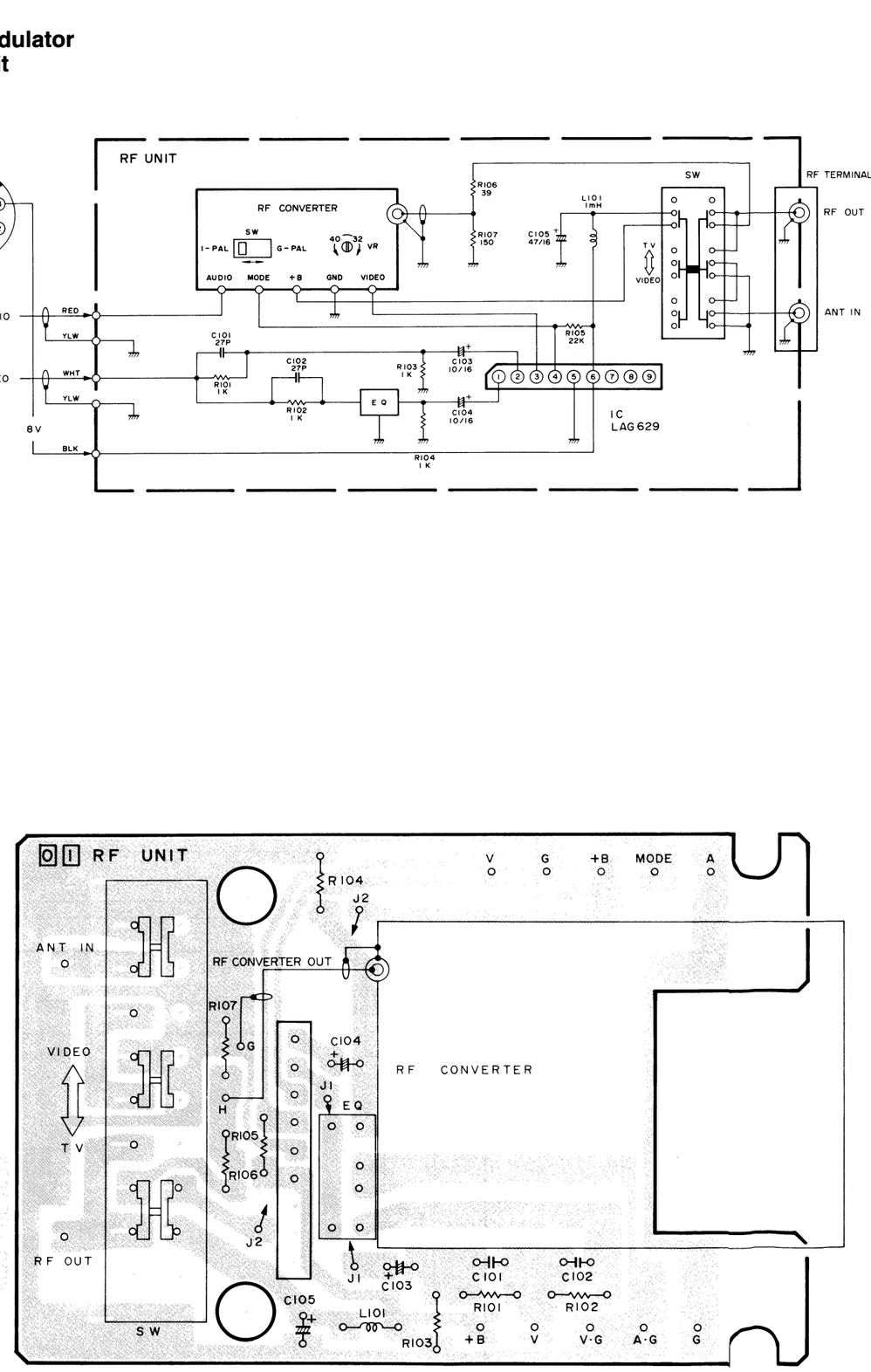


2SD958



HF-Modulator
RF-Unit





Netz- und Ladegerät
AC power adaptor and battery charger

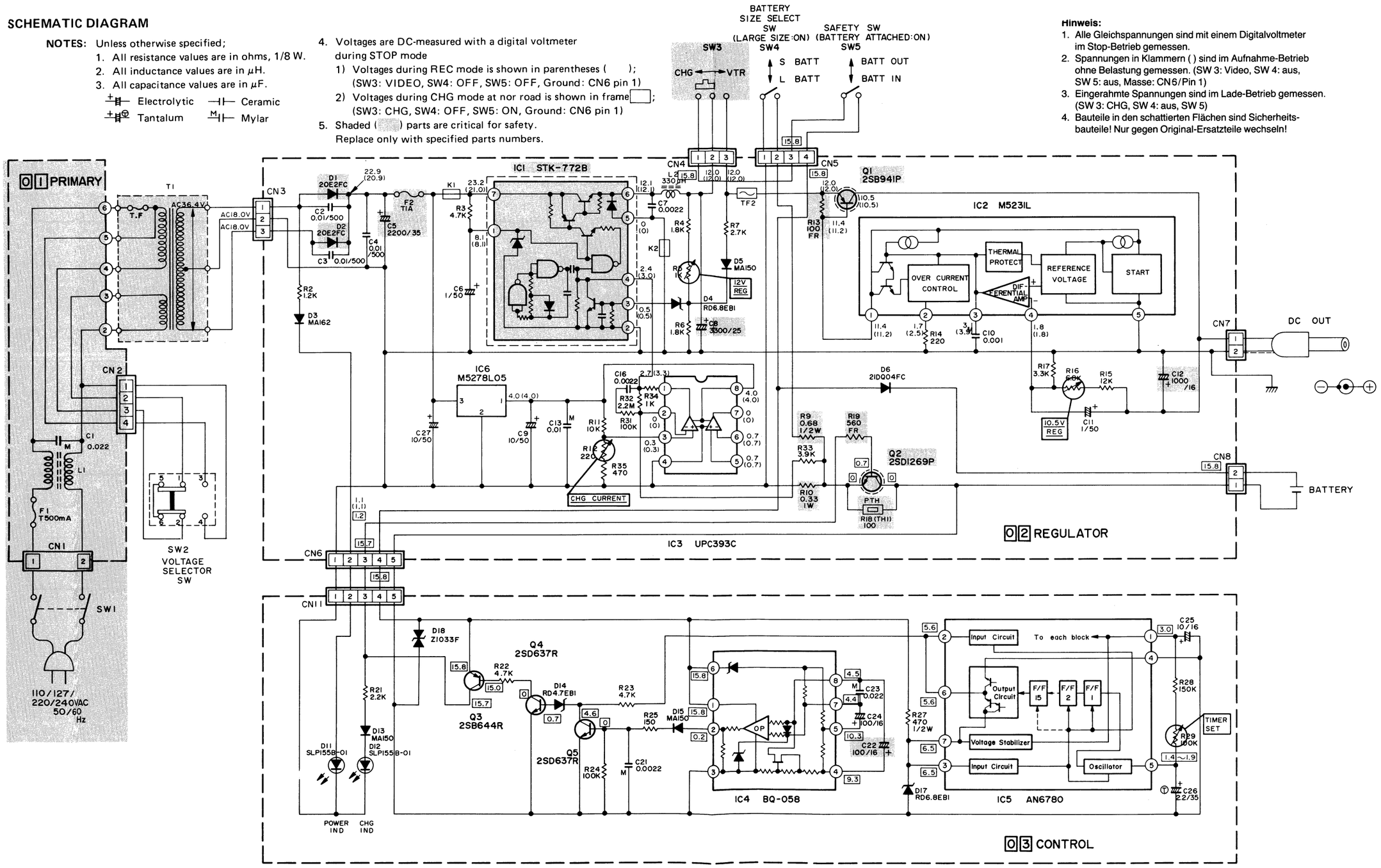
SCHEMATIC DIAGRAM

NOTES: Unless otherwise specified;
1. All resistance values are in ohms, 1/8 W.
2. All inductance values are in μH.
3. All capacitance values are in μF.

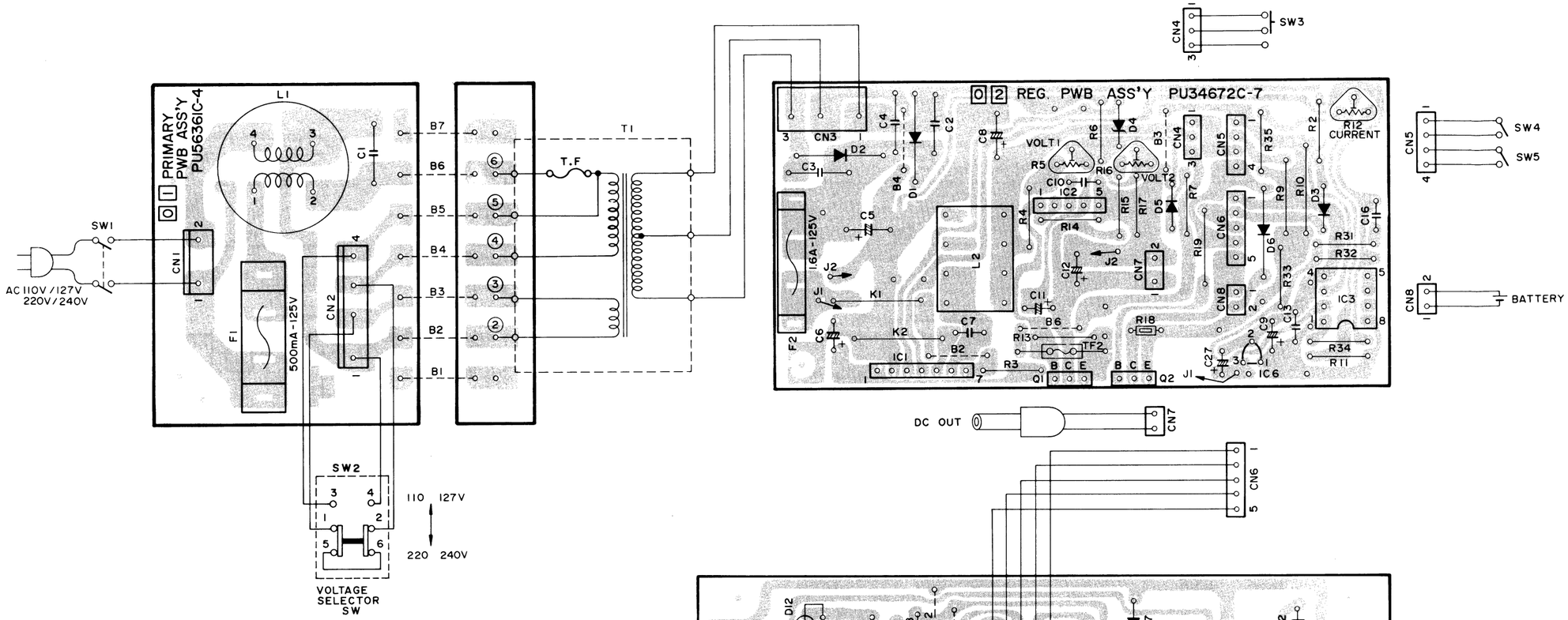
Electrolytic — Ceramic
Tantalum — Mylar

4. Voltages are DC-measured with a digital voltmeter during STOP mode
   1) Voltages during REC mode is shown in parentheses ( );
   (SW3: VIDEO, SW4: OFF, SW5: OFF, Ground: CN6 pin 1)
   2) Voltages during CHG mode at nor road is shown in frame [ ];
   (SW3: CHG, SW4: OFF, SW5: ON, Ground: CN6 pin 1)
5. Shaded ( ) parts are critical for safety.
   Replace only with specified parts numbers.

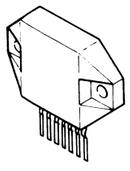
Hinweis:
1. Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stop-Betrieb gemessen.
2. Spannungen in Klammern ( ) sind im Aufnahme-Betrieb ohne Belastung gemessen. (SW 3: Video, SW 4: aus, SW 5: aus, Masse: CN6/Pin 1)
3. Eingerahmte Spannungen sind im Lade-Betrieb gemessen. (SW 3: CHG, SW 4: aus, SW 5)
4. Bauteile in den schattierten Flächen sind Sicherheitsbauteile! Nur gegen Original-Ersatzteile wechseln!



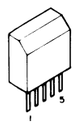
Netz- und Ladegerät
AC power adaptor and battery charger



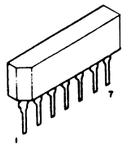
IC1 : STK-772B

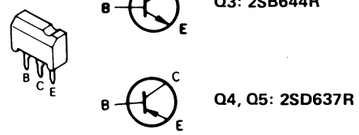


IC2: M5231L



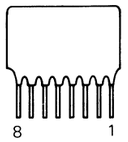
IC5: AN6780

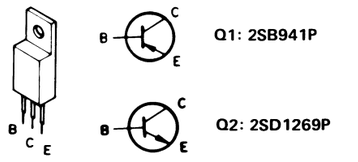




IC3: UPC393C

IC4 : BQ-058

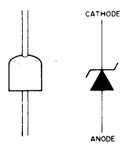




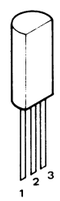
D4, D17 : RD6.8EB1
D14 : RD4.7EB1

D1, D2 : 20E2FC
D3 : MA162
D6 : 21DQ04FC
D5, D13, D15, D18 : MA150

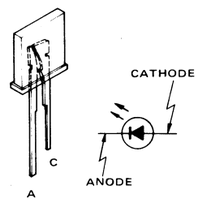
D18 : Z1033F



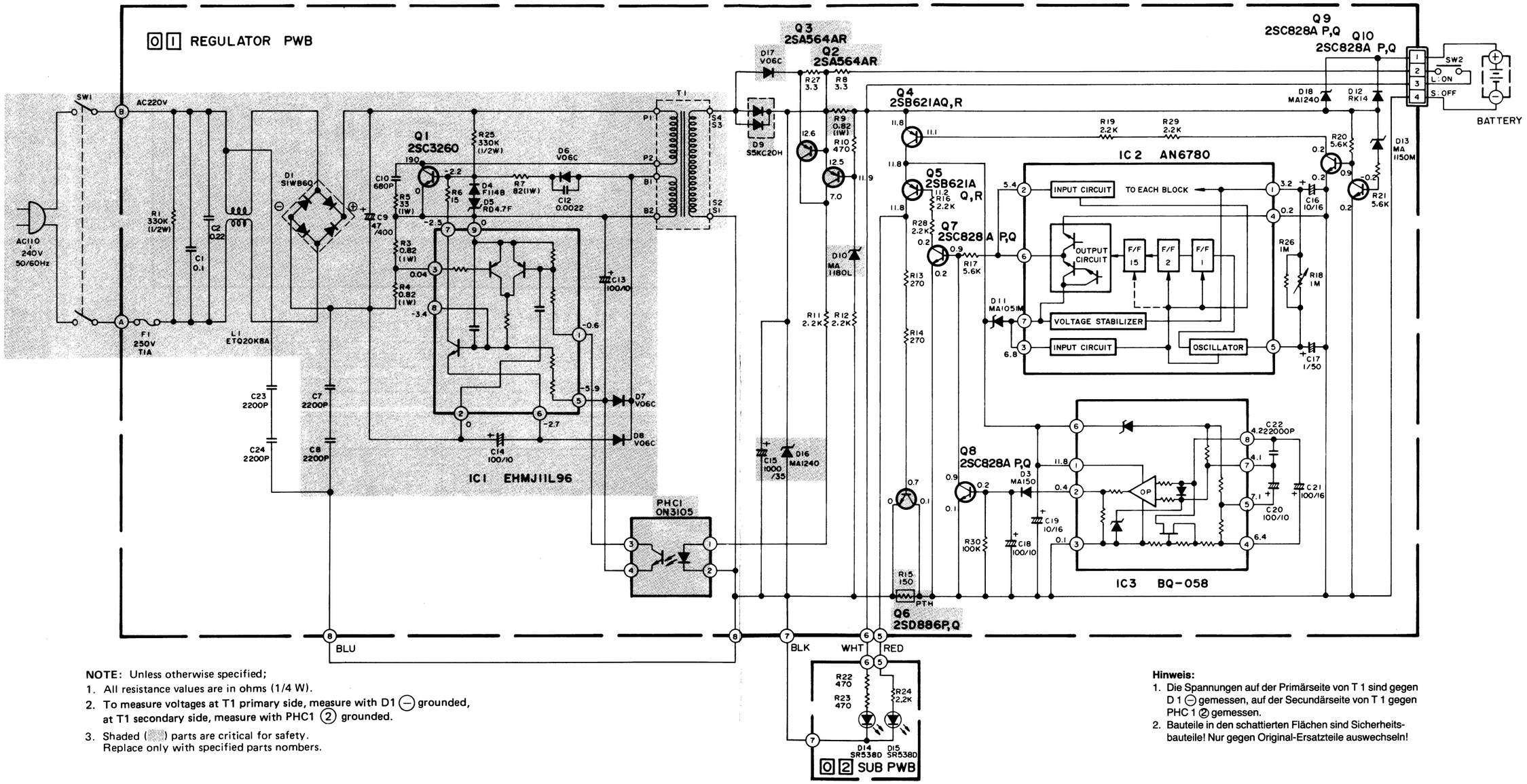
IC6 : M5278L05



D11, D12 : SLP155B-01



Akku-Ladegerät
Battery charger



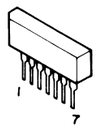
NOTE: Unless otherwise specified;

1. All resistance values are in ohms (1/4 W).
2. To measure voltages at T1 primary side, measure with D1 ⊖ grounded, at T1 secondary side, measure with PHC1 ② grounded.
3. Shaded (▨) parts are critical for safety. Replace only with specified parts nombers.

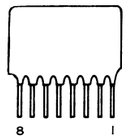
Hinweis:

1. Die Spannungen auf der Primärseite von T 1 sind gegen D 1 ⊖ gemessen, auf der Secundärseite von T 1 gegen PHC 1 ② gemessen.
2. Bauteile in den schattierten Flächen sind Sicherheitsbauteile! Nur gegen Original-Ersatzteile auswechseln!

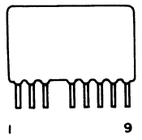
IC2 : AN6780



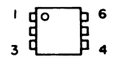
IC3 : BQ-058



IC3 : J11L96

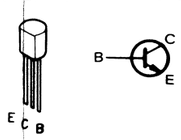


PHC : ON3105

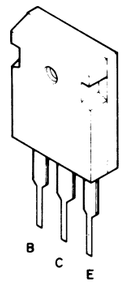


Q2, Q3 : 2SA564AR
Q4, Q5 : 2SB621AQ

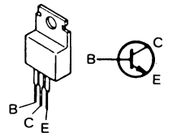
Q7, Q8, Q9, Q10 : 2SC828AP, Q



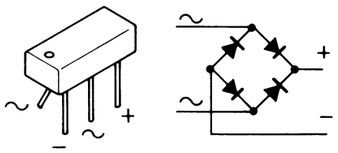
Q1 : 2SC3260



Q6 : 2SD886P, Q

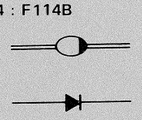


D1 : S1WB60

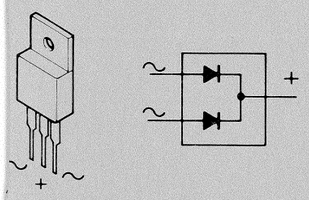


Akku-Ladegerät
Battery charger

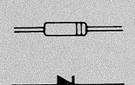
D6, D7, D8, D17 : V06C
D4 : F114B



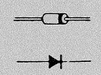
D9 : S5KC20H



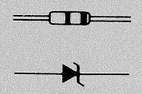
D3 : MA150



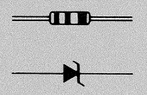
D12 : RK14



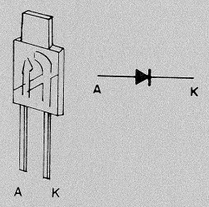
D10 : MA1180L
D13 : MA1150M
D16 : MA1240



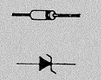
D11 : MA1051M

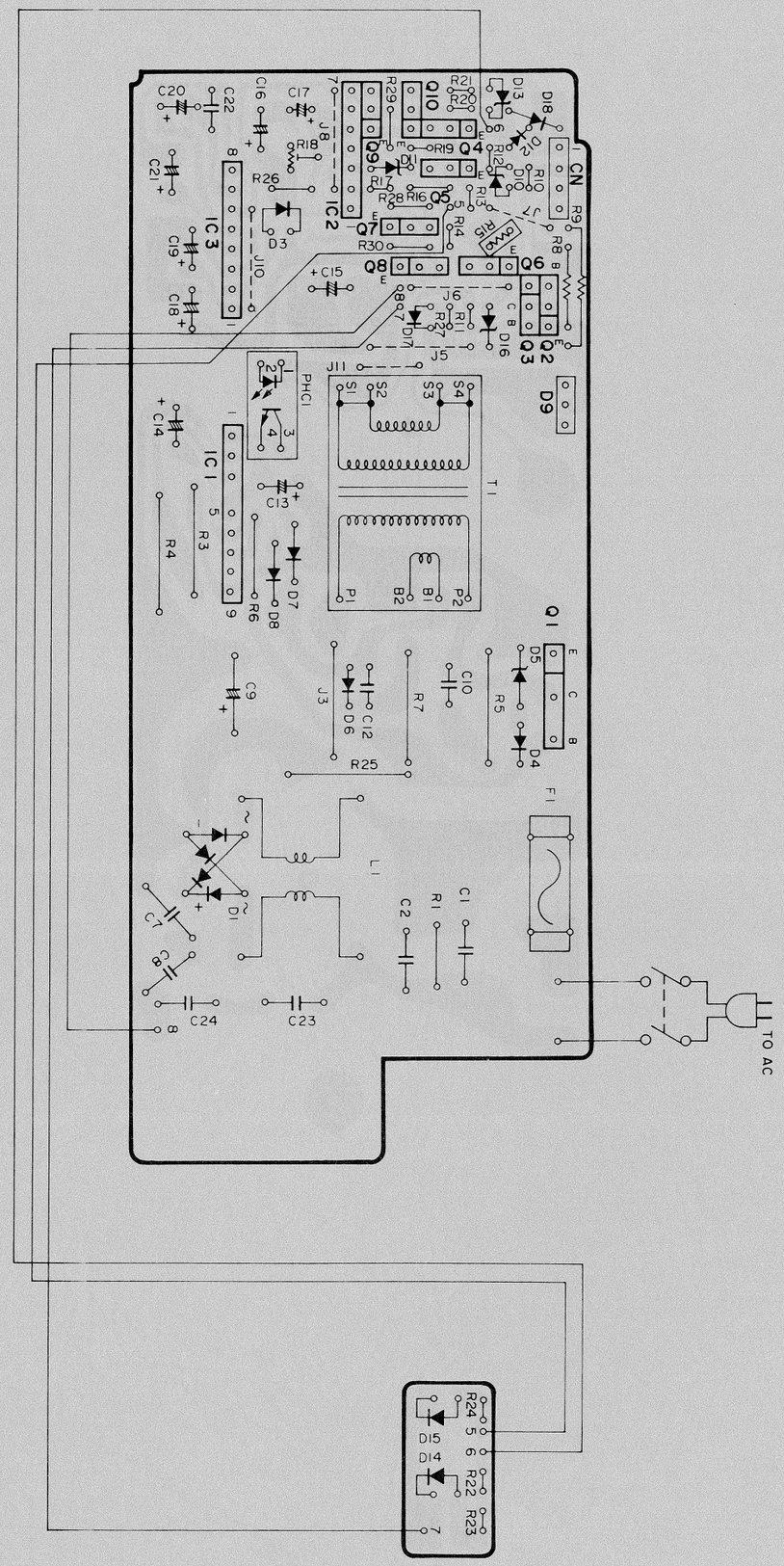


D14, D15 : SR538D

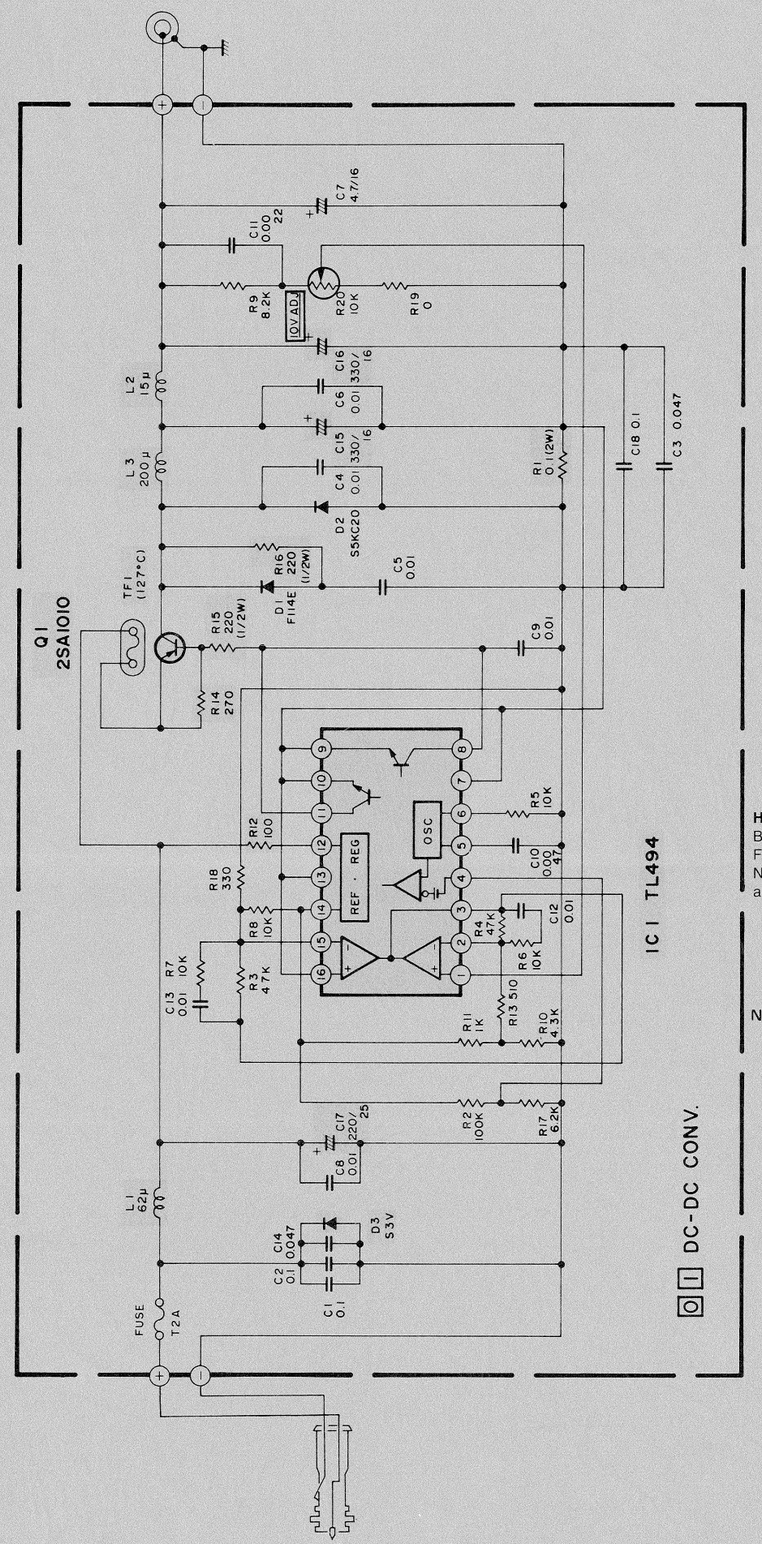


D5 : RD4.7F





Bordnetzkabel (Autobatterie-Adapter)
DC-DC Converter



Hinweis:
Bauteile in den schattierten Flächen sind Sicherheitsbauteile! Nur gegen Originalteile auswechseln!

NOTES: Unless otherwise specified.

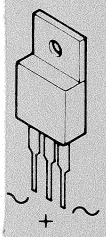
1. All resistance values are in ohms.
2. All inductance values are in μH.
3. All capacitance values are in μF.

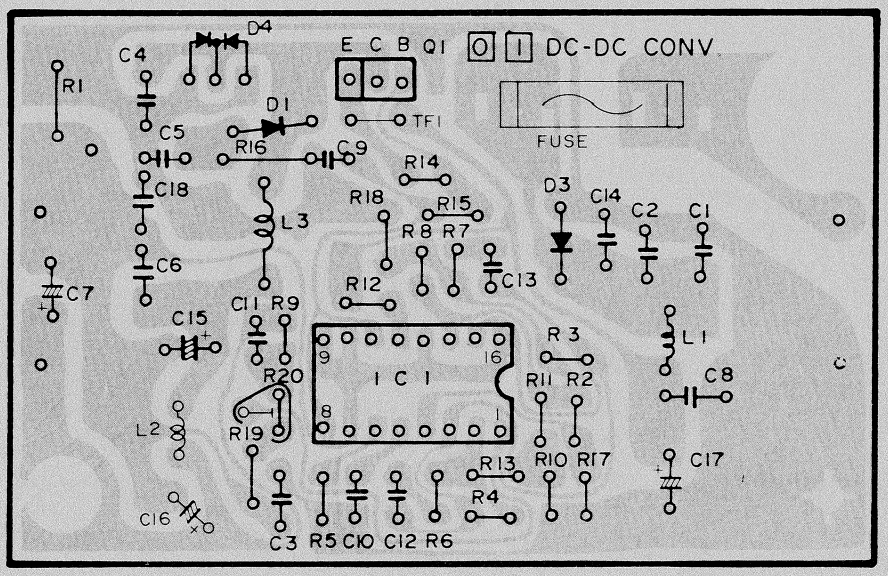
: Chip capacitor
: Electrolytic capacitor
: Non-polar capacitor
: Tantalum capacitor
: Polypropylene capacitor
: Mylar capacitor

4. Shaded ( ) parts are critical for safety. Replace only with specified aprt numbers.

Bordnetzkabel
DC-DC Converter

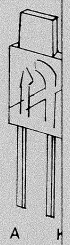
D6,
D4 :





D

D1



JVC

SERVICE MANUAL

VHS VIDEO MOVIE VHSC

GR-C1 EG AA-P1 EG BB-P1 EG AP P1 E

EINSTELLANWEISUNG

SPEZIFIKATION

Format	:	VHS standard
Power source	:	9.6 V ⎓
Power consumption	:	7.6 watts (nominal in the record mode)
Signal system	:	PAL
Recording system	:	Luminance: FM recording Colour: Converted sub-carrier direct recording Conforms to VHS standard
Cassette	:	VHS-C cassette
Tape speed	:	23.39 mm/sec.
Recording time Max.	:	30 minutes (with EC-30 cassette)
Video		
Output	:	1 Vp-p, 75 ohms, unbalanced (via VIDEO/ AUDIO OUT connector)
S/N ratio	:	40 dB (with Rohde & Schwarz noise meter)
Audio		
Output	:	−6 dBs, 1 k-ohm (via VIDEO/AUDIO OUT connector)
Microphone input	:	−68dBs, 10 k-ohms, unbalanced

Pick up tube	:	1/2" High-Band Saticon*, single-carrier frequency separation system
Minimum required illumination	:	15 lux (at f/1.2 with sensitivity switch set to UP)
Illumination range	:	15 – 100,000 lux (auto iris mode with sensitivity switch set to UP)
Lens	:	f/1.2, f = 8 – 48 mm, 6 : 1 power zoom lens with auto iris control and macro position, filter diameter 49 mm
Viewfinder	:	Electronic viewfinder with 1/2" (12.7 mm) black/white CRT
Colour temperature switching	:	Switchable filter (3,200 K/5,200 K)
White balance adjustment	:	Automatic/preset standard
Operating temperature	:	0°C to +40°C
Operating humidity	:	Less than 80%
Storage temperature	:	−20°C to +30°C
Weight	:	1.9 kg (with viewfinder)

Dimensions	:	108 (W) x 136 (H) x 314 (D) mm (excl. viewfinder, lens hood and battery pack) 176 (W) x 136 (H) x 340 (D) mm (incl. viewfinder, lens hood and NB-P5U battery pack)

*Saticon is a registered trademark.

Design and specifications subject to change without notice.

No. 8361-T2
August 1984

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3. Mechanischer Abgleich

3.1. Allgemeines

3.1.1 Wichtige Hinweise

1. Beim Austausch oder Entlöten von Bauteilen Gerät vom Netz trennen.
2. Die Mechanik des Bandlaufwerks wurde im Werk präzise eingestellt und bedarf im Normalfall keiner Nachjustage.
3. Befestigungsschrauben vorsichtig anziehen, um Beschädigungen am Chassis zu vermeiden.
4. Um einen Ladevorgang ohne Cassette zu ermöglichen, ist der Endsensor abzudecken und der Cassettenschalter kurzzuschließen.

3.1.2. Lehren und Werkzeuge

Für die einwandfreie Einstellung der Mechanik sind die nachfolgenden Lehren und Werkzeuge unbedingt erforderlich. Ohne sie sind zeitraubende Versuche notwendig, die eventuell zu Schäden des Gerätes führen können. Neben normalen Werkzeugen wird außerdem ein metrischer Inbusschlüssel benötigt.

1. Erforderliche Ausrüstung:
   Farb-Fernsehempfänger oder Monitor
   Oszilloskop: Breitband, Zweikanal, triggerbar mit Ablenkverzögerung
   Compakt Video-Cassette (für Aufnahmen)
   Abgleich-Testcassette MH-C 2

3. Mechanical Adjustment

3.1. General

3.1.1 Precautions

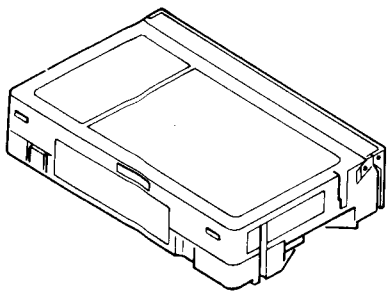
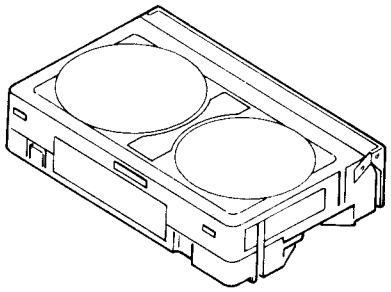
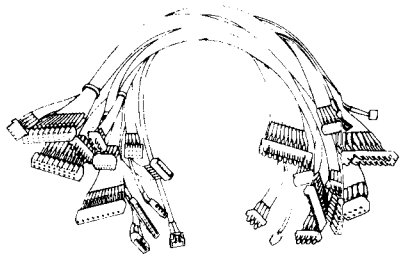
- **Important**

1. Disconnect from power before removing or soldering components.
2. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
3. Tighten the screws carefully to avoid damage to the chassis.
4. For service procedures that call for loading motion of the set without using a video cassette, disable the END SENSOR by applying opaque cover and put the CASSETTE SWITCH in Function Position.

3.1.2 Required Test Equipment, Jigs and Tools

For proper mechanical adjustment, the following test equipment, jigs and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage to the unit. In addition, general-purpose tools and a metric hex key (obtain locally) are required.

1. Test equipment required:
   Color television or monitor
   Oscilloscope: wide-band, dual trace, triggered, delayed sweep
   Compact video cassette (recording tape)
   Alignment tape

Abgleichband MH-C2/*Alignment tape MH-C2*	Bandzug-Meßcassette/*Cassette tourque meter*	Kabelsatz/*Patch cord*
		

Tabelle/Table 3-1 Lehren/*Jigs*

2. Inhalt der Testcassette MH-C 2

2. Alignment tape contents

Teil *Segment*	Spielzeit *Playback Time*	Video-Signal *Video Signal*	Audio-Signal *Audio Signal*	Anwendung *Applications*
1	3 min	(ohne) *(none)*	(ohne) *(none)*	
2	5 min	Grautreppe *Stairstep*	6 kHz	● Wiedergabe Prüfung und Abgleich *Playback checks and adjustments* ● Servo-Schaltung Test *Servo circuit checks and adjustments* ● Audiokopf Azimuth Einstellung *Audio head azimuth adjustments*
3	3 min	(ohne) *(none)*	3 kHz	● Bandgeschwindigkeits-Test *Tape speed checks* Tonhöhenschwankungs-Test *Wow and flutter checks*
4	6 min	Farbbalken *Color bars*	1 kHz	● Audio bzw. Videosignal-Wiedergabe-Test und Abgleich *Video signal playback circuit checks and adjustments* *Audio signal playback circuit checks and adjustments*
5	2 min	HF-Pegel *RF sweep*	(ohne) *(none)*	● Kopfresonanz-Abgleich *Video head resonance and Q adjustments* ● Frequenz Marken 2,0, 4,0, 5,0 MHz *Markers: 2.0, 4.0, 5.0 MHz*

Tabelle/Table 3-2 MH-C2 Testband Inhalt/*MH-C2 contents*

3.2 Periodische Wartung

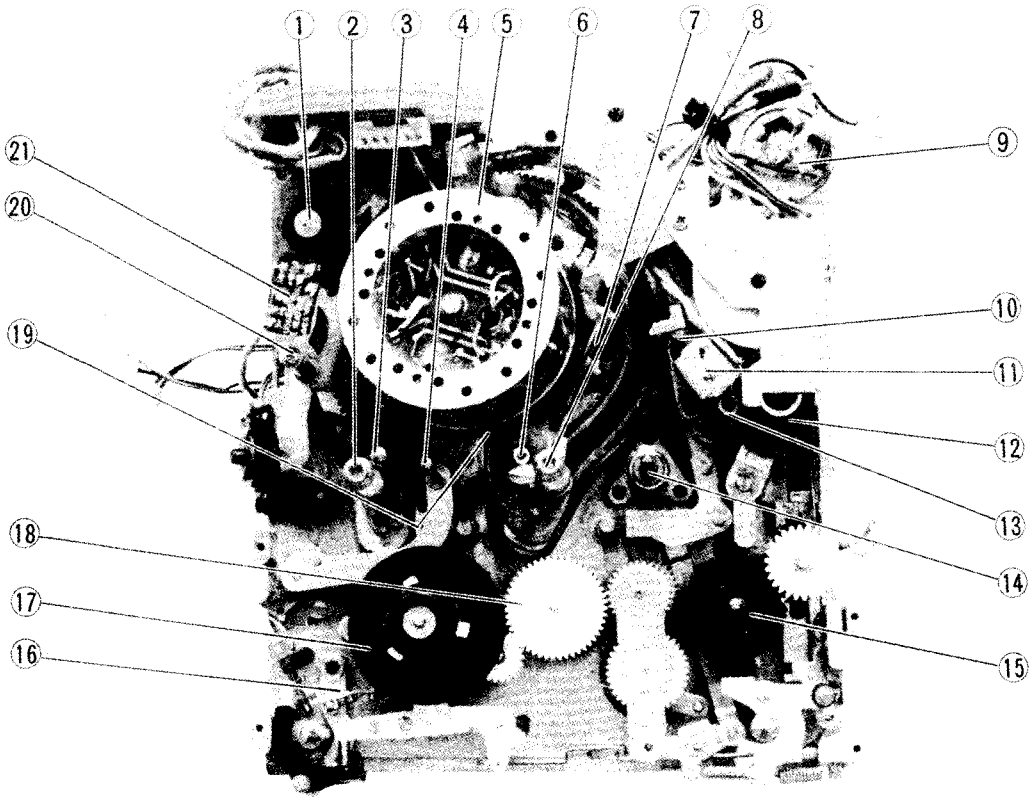
Um eine optimale Arbeitsweise und Zuverlässigkeit des Video-Cassetten-Recorders zu erhalten, wird empfohlen, die folgenden Wartungsintervalle einzuhalten.

3.2 Periodic Maintenance

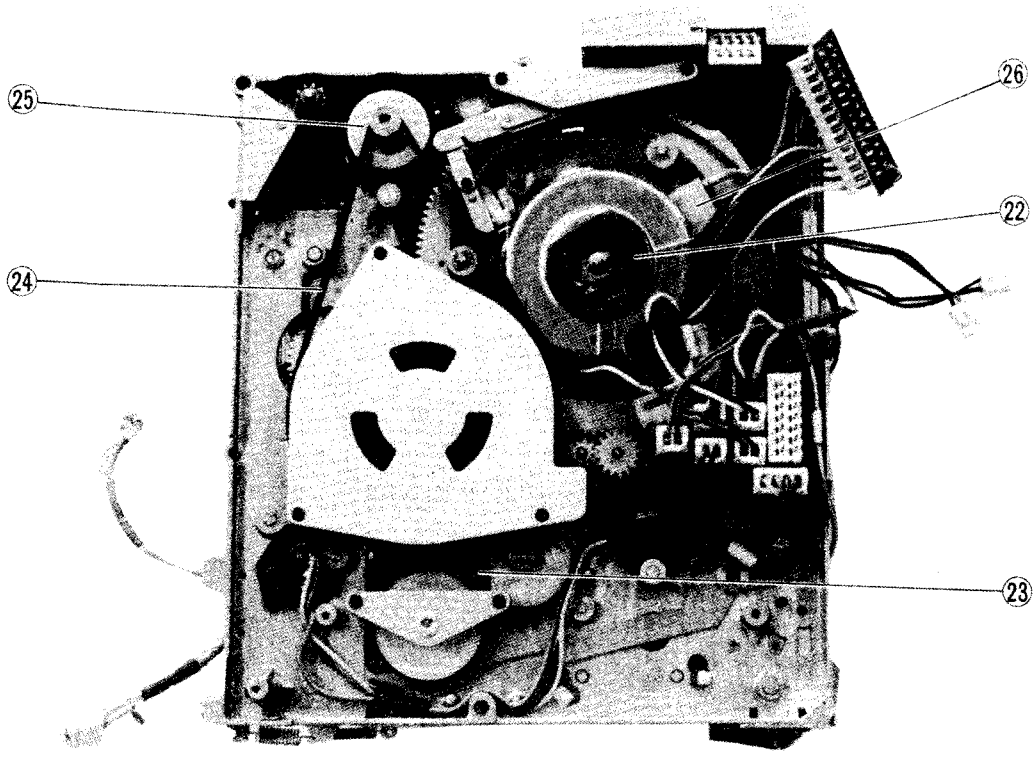
The following procedures are recommended for maintaining optimum performance and reliability of this video cassette recorder.

3.2.1 Lage wichtiger mechanischer Teile

3.2.1 Layout of Maintenance Parts



(a) Draufsicht
Top view



(b) Untenansicht
Bottom view

1 Spannrolle
Impedance roller
2 Abwickel-Führungsrolle
SUP guide roller
3 Abwickel-Umlenkrolle
SUP slant pole
4 Fühlstift
Tension pole
5 Obere Kopftrommel
Upper drum
6 Aufwickel-Umlenkbolzen
TU slant pole
7 Mittelbolzen
Middle pole
8 Aufwickel-Führungsrolle
TU guide roller
9 Lademotor
Mode control motor
10 Aufwickel-Führungsbolzen (2)
TU guide pole (2)
11 Audio-/Synchronkopf
A/C head
12 Andruckrolle
Pinch roller
13 Aufwickel-Führungsbolzen
TU guide pole
14 Capstan
Capstan
15 Aufnahme-Kupplungsgetriebe
TU clutch gear
16 Bremsband
Tension band
17 Bandteller
Reel disk
18 Abwickel-Kupplungsgetriebe
SUP clutch gear
19 Untere Kopftrommel
Lower drum
20 Abwickel-Führungsbolzen
SUP guide pole
21 Vollöschkopf
Full-erase head
22 Schleifkontakt
Brush
23 Wickelriemen
Reel belt
24 Capstan-Riemen
Capstan belt
25 Capstan-Motor
Capstan motor
26 Impulskopf
PU head

Abb./Fig. 3-1 Wartungsteile/*Maintenance parts*

3.2.2 Service-Intervalle

Die nachfolgende Tabelle enthält die Daten für Service-Intervalle der wichtigsten mechanischen Teile.

3.2.2 Service Schedule for Main Components

The following table lists the parts which should receive periodic servicing at the recommended intervals.

	Teilebezeichnung *Part name*	Siehe Abschn. *Refer. section*	Übliche Wartungsfristen *Periodic service schedule* 500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Bemerkungen *Remarks*
Bandtransport *Tape transport system*	Fühlstift *Tension pole* Abwickelumlenkbolzen *SUP slant pole* Abwickelführungsrolle *SUP guide roller* Abwickelführungsbolzen *SUP guide pole* Spannrolle *Impedance roller* Mittelbolzen *Middle pole* Aufwickelführungsbolzen (2) *TU guide pole (2)* Aufwickelführungsbolzen *TU guide pole* Capstan *Capstan* Aufwickelführungsrolle *TU guide roller* Aufwickelumlenkbolzen *TU slant pole* Untere Kopftrommel *Lower Drum*		□	□	□	□	□	□	□	□	□	□	– Zur Reinigung sind ein alkoholgetränktes, fusselfreies Tuch oder Gaze zu verwenden. Nach der Reinigung mit Alkohol müssen die Teile sorgfältig trocknen, bevor ein Kassettenband verwendet werden kann. *For cleaning, use a lint-free cloth or gauze dampened with alcohol.* *After cleaning with alcohol, allow the parts to dry thorougly before using a cassette tape.*
	Obere Kopftrommel *Upper drum*	3.3.3	□	○	●	□	○	●	□	○	●	□	– Bei der Reinigung der Kopfspitzen an der Kopftrommel darf keine Vertikalbewegung ausgeführt werden. Streichen Sie nur vorsichtig nach hinten und vorne in Richtung des Bandverlaufs. *When cleaning the head tips on the upper drum, do not clean them with a vertical stroke. Use only a gentle back and forth motion in the direction of the tape path.*
	Vollöschkopf *Full erase head*	3.3.6	□	□	□	□	□	□	□	□	□	○	
	Audio-/Synchronkopf *Audio/control head*	3.3.5	□	□	□	□	□	●	□	□	□	□	
	Andruckrolle *Pinch roller*	3.3.4	□	□	□	□	□	●	□	□	□	□	
Antrieb *Drive system*	Capstanmotor *Capstan motor*	3.3.11				●				●			
	Wickelriemen *Reel belt*	3.3.12		○		●		○		●		○	
	Capstan-Riemen *Capstan belt*	3.3.12		○		●		○		●		○	
	Lademotor *Mode control motor*	3.3.7						●					
	Bandteller *Reel disk*	3.3.8				△				△		○	– Nicht zu stark schmieren. *Do not over lubricate.*
	Abwickel-Kupplungsgetriebe *SUP clutch gear*	3.3.9		○		○		○		○		○	
	Aufnahme-Kupplungsgetriebe *TU clutch gear*	3.3.9		○		○		○		○		○	– Drehmomentprüfung – siehe Abschnitt 3.4.3. *Torque check refer to section 3.4.3.*
Andere Teile *Others*	Schleifkontakt *Brush*	3.3.13	□	□	□	□	□	□	□	□	□	○	
	Bremsband *Tension band*	3.3.10		○		○		○		○		○	– Prüfung des Bremszugs – siehe Abschnitt 3.4.4. *Back tension check – refer to section 3.4.4.*

□ Reinigung *Cleaning* ● Austausch *Replacement* △ Schmieren *Lubrication* ○ Überprüfen und ggf. austauschen *Check and replace if necessary*

Tabelle/Table 3-3 Übliche Wartungsfristen / *Standard service periods*

Die in der Tabelle aufgeführten Austauschzeiten hängen im wesentlichen von den Umgebungs- und Gebrauchsbedingungen ab. Routinemäßige Pflege und Wartung sind daher mitentscheidend für die Lebensdauer des Gerätes. Gummiteile können durch Alterung oder lange Lagerung deformiert werden, auch dann, wenn das Gerät nicht benutzt wird.

Hinweis: Auch wenn das Gerät nicht ständig betrieben wird, sollte das Reinigen, Abschmieren und Auswechseln von Antriebsriemen alle 2 Jahre erfolgen.

Above replacement times will vary greatly according to environmental and usage conditions. Routine inspection and maintenance are also important factors that influence the unit life. Note that rubber parts may become aged or deformed after long periods of storage, even if the unit is not used.

Note: Even if the unit is not used frequently, cleaning, lubrication and replacement of the belts should be undertaken every 2 years.

3.3 Ausbauhinweise der wichtigsten Baugruppen

Vor dem Ersatz von mechanischen Teilen ist es erforderlich, Gehäuseteile, Abdeckungen, Leiterplatten, Abschirmbleche und das Cassettenfach zu entfernen.

3.3.1 Cassettenfach (Abb. 3-2)

- **Ausbau**

1. Befestigungsschrauben lösen und Cassettenfach herausnehmen. Das Fach kann in verriegeltem Zustand entfernt werden.

- **Einbau**

1. Das Cassettenfach zunächst nur lose an die Chassisplatte anschrauben. Das Festziehen der Schrauben erfolgt zu einem späteren Zeitpunkt.
2. Video-Cassette einlegen und vorsichtig, ohne das Band zu beschädigen, das Cassettenfach in Raststellung bringen.
3. Nachdem die richtige Position des Cassettenfachs sichergestellt wurde, dieses leicht nach vorne (entgegengesetzte Richtung zur Kopftrommel) bringen und danach die Schrauben vorsichtig anziehen. Der lichte Abstand rechts und links vom Cassettenfach wird später eingestellt, wenn der Abstand von der Cassettenfach-Abdeckung zum Gehäuseoberteil bestimmt wird.
4. Gerät in Betrieb nehmen und Cassettenauswurf betätigen. Prüfen, ob das Cassettenfach einwandfrei arbeitet.
5. Videocassette entladen und wieder laden und das Cassettenfach herunterdrücken. Dabei prüfen, ob das Cassettenfach einwandfrei einrastet, ohne dabei das Band zu beschädigen.
6. Mehrere Male die Funktionen „Schneller Vorlauf" (FF) bzw. „Schneller Rücklauf" (REW) betätigen, um einwandfreies Funktionieren zu gewährleisten.

3.3 Main Assembly Replacement

To facilitate parts replacement, external covers, circuit boards, shield plates, and the cassette housing may be removed as required.

3.3.1 Cassette Housing (Fig. 3-2)

- **Removal**

1. Remove the screws, then lift the cassette housing and remove it. The cassette housing can be removed in the locked state.

- **Mounting**

1. Loosely screw the cassette housing to the deck. The cassette housing must be positioned later, so do not fully tighten the screws at this time.
2. Place a video cassette into the cassette housing. Now bring down and lock the cassette housing. Be careful not to damage the tape.
3. After making sure that the video cassette is positioned correctly, lightly bring the cassette housing (the opposite side of the drum) toward you carefully and tighten the mounting screws. Clearance at the right and left of the cassette housing will be set later when the clearance between the cassette cover and the upper case is determined.
4. Turn on the power supply then eject the cassette to make sure that the cassette housing operates smoothly.
5. Remove the video cassette, then insert it again and press down the cassette housing. Check that the cassette housing locks smoothly without damaging the tape.
6. Check the FF (Fast Forward)/REW (Rewind) operations repeatedly to ensure normal operation.

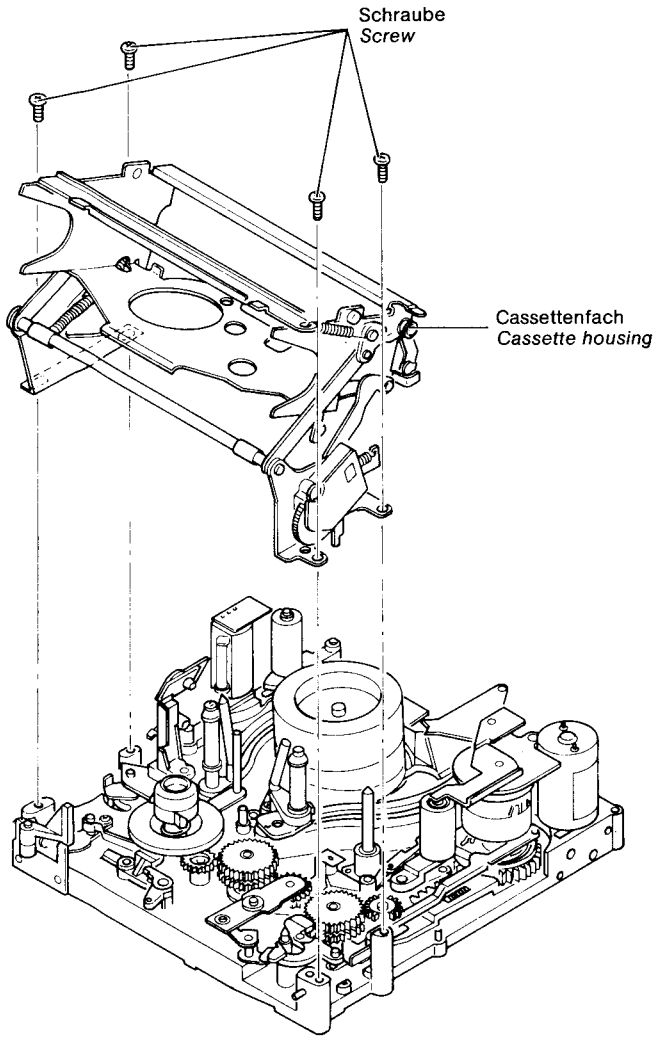


Abb./Fig. 3-2 Cassettenfach
Cassette housing

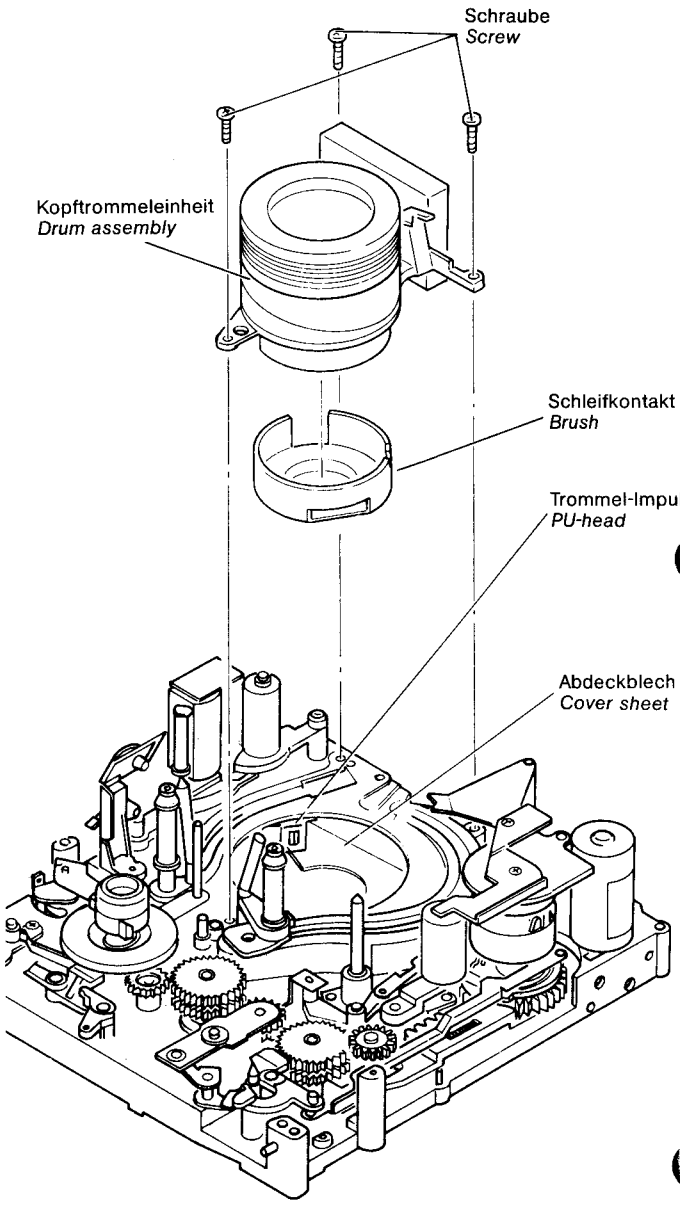


Abb./Fig. 3-3 Kopftrommel-Einheit
Drum assembly

3.3.2 Kopftrommel-Einheit (Abb. 3-3)

1. Stecker CN8 von der Leiterplatte M/S abziehen.
2. Schrauben entfernen. Nach dem Lösen des Abdeckbleches, die Kopftrommel vorsichtig (wegen des geringen Abstandes zum Impulskopf) herausnehmen.
3. Schleifkontakt von der Kopftrommel entfernen und die Kopftrommel austauschen.
4. Motorabdeckung vorübergehend an der neuen Kopftrommel anbringen. Die endgültige Montage zwischen Motorabdeckung und Impulskopf geschieht, nachdem die Kopftrommel befestigt ist.
5. Die neue Kopftrommel unter äußerster Vorsicht einsetzen und festschrauben.
6. Das Abdeckblech wieder einsetzen und den Stecker CN8 mit der M/S-Platine verbinden.
7. Danach die Justage der Kopftrommelimpulse durchführen (siehe Abschnitt 4.3.1) und für den Servo-Kreis die Kopftrommel-Abtastposition (siehe Abschn. 4.3.2)
8. Bandführungskontrolle (siehe Abschn. 3.4.4) und die Funktion des Bandlaufes (Cassettenaustauschbarkeit) prüfen und einstellen (siehe Abschn. 3.4.5).
9. Wiedergabe/Aufnahme-Schaltpunkt des Servo-Kreises einstellen (siehe Abschn. 4.3.4 und 4.3.5) und danach die Prüfung und die Justage des gesamten Signalweges durchführen (siehe Abschn. 4.4 und 4.5).

3.3.3 Kopftrommel tauschen

1. Möglichst schnell die Anschlußdrähte von den Relais-Kontakten der Kopftrommel ablöten.
2. Die Schrauben ① entfernen und die Kopftrommel nach oben abziehen.
3. Die Kontaktflächen der oberen und unteren Kopftrommel mit Alkohol reinigen.
4. Beim Einbau das Berühren der Videoköpfe und Beschädigungen der Bandlaufflächen vermeiden! Die Anschlußdrähte verdrillen und von unten in die neue Kopftrommel einführen und Kopftrommel vorsichtig einsetzen.
5. Die Schrauben ① einsetzen und gleichmäßig anziehen.
6. Sämtliche Anschlußdrähte, entsprechend Tabelle 3-4, unter Vermeidung zu großer Hitze anlöten.
7. Nach Reinigen der neuen Kopftrommel mit Alkohol ist die Cassettenaustauschbarkeit zu prüfen bzw. einzustellen (siehe Abschn. 3.4.4). Danach ist der W/A (PB/REC) Schaltpunkt des Servo-Kreises abzugleichen (siehe Abschn. 4.3.4 und 4.3.5).
8. Das Kopfsystem von Y/C und Vorverstärker entsprechend Abschnitt 4.4.1 bis 4.4.4 einstellen.

3.3.2 Drum Assembly (Fig. 3-3)

1. Disconnect CN8 from the M/S board.
2. Remove the screws. After releasing the cover sheet, lift out the drum assembly carefully because the clearance between the PU head and the drum assembly is small.
3. Remove the brush from the drum assembly, and replace the drum assembly.
4. Install the brush on the new drum assembly temporarily. It will be repositioned between the brush and the PU head after the drum assembly is mounted.
5. Being careful not to damage the PU head, position the drum carefully and fix it in place.
6. Attach the cover sheet in place, and connect CN8 to the M/S board.
7. Perform the drum pulse adjustment (see section 4.3.1), then perform the drum sampling position adjustment for the servo circuit (see section 4.3.2).
8. Check and adjust the tape transport system (see section 3.4.4) and the interchangeability (see section 3.4.5).
9. Adjust the PB/REC switching points of the servo circuit (see sections 4.3.4 and 4.3.5), and completely check and adjust the signal circuits (see sections 4.4 and 4.5).

3.3.3 Upper Drum (Fig. 3-4)

1. Quickly unsolder the wires from the relay pins on the upper drum.
2. Remove screws① and pull the upper drum up and out.
3. Using alcohol, clean the surfaces that contact the upper and lower drums.
4. Hold the new upper drum carefully so you do not touch the video heads. Bundle and properly pass the wires from the lower drum through, and carefully set the new upper drum in place.
5. Tighten screws① evenly.
6. Connect all wires (see Table 3-4).
7. After cleaning the upper drum with alcohol, check and adjust it for interchangeability (see section 3.4.5), and adjust the PB/REC switching points of the servo circuit (see sections 4.34 and 4.3.5).
8. Adjust the head system of the Y/C and preamplifier circuit (see sections 4.4.1 through 4.4.4).

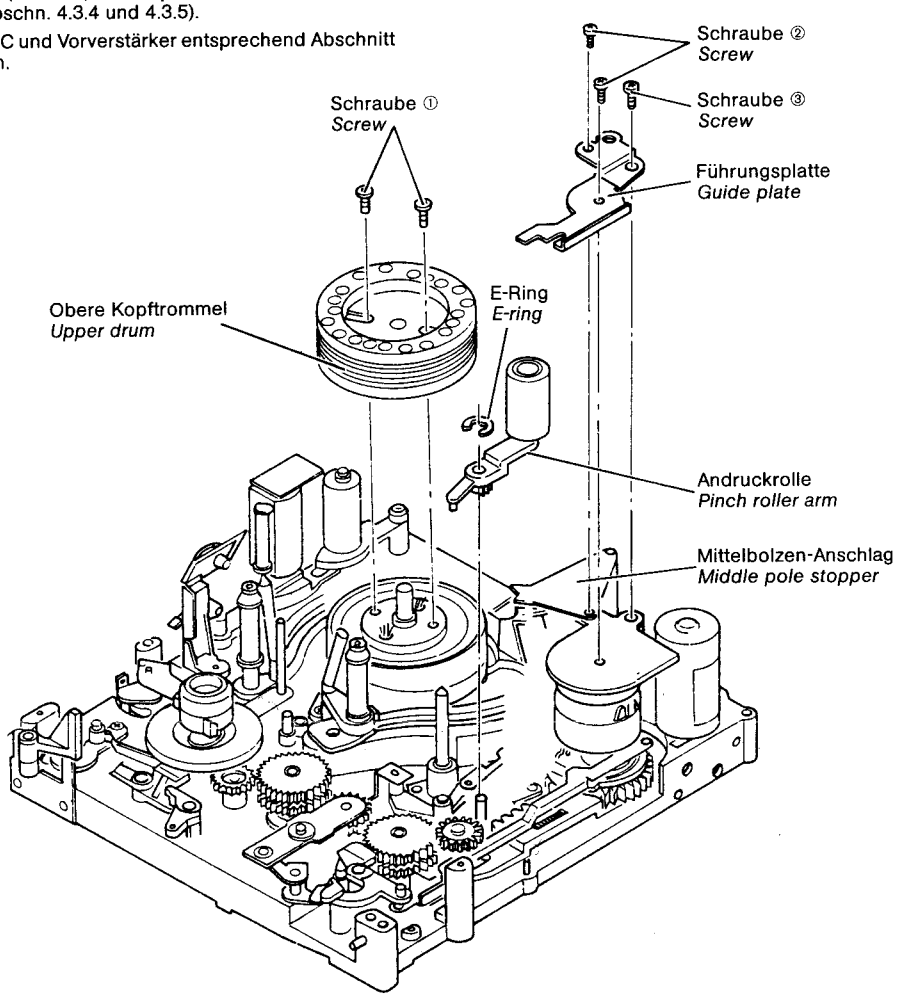


Abb./Fig. 3-4 Obere Kopftrommel und Andruckrolle
Upper drum and pinch roller

Spur (Kanal)	Stützpunkt Farbe	innere und äußere Drahtfarbe
1	braun	braun/schwarz
2	rot	rot/weiß
3	orange	orange/grün
4	gelb	gelb/blau

Tabelle 3-4 Kopftrommel-Verdrahtung

Channel	*Relay Pin Color*	*Wire Color Forward (Backward)*
1	*Brown*	*Brown (Black)*
2	*Red*	*Red (White)*
3	*Orange*	*Orange (green)*
4	*Yellow*	*Yellow (Blue)*

Table 3-4 *Upper drum wiring*

3.3.4 Andruckrolle (Abb. 3-4)

1. Die Schrauben ② und die Führungsplatte entfernen.
2. Die Schrauben ③ entfernen und die Andruckrolle herausnehmen.
3. Die neue Andruckrolle in umgekehrter Reihenfolge wieder einsetzen.
4. Sicherstellen, daß der Mittelbolzenanschlag in der richtigen Position zum Lagerbolzen ist (siehe Abschn. 3.4.1).

3.3.5 Audio/Synchronkopf (A/C-Kopf) Abb. 3-5

1. Ladevorgang einleiten, ohne dabei eine Videocassette zu benutzen (siehe Abschn. 3.1). Nach dem Ladevorgang den Netzstecker ziehen.
2. Die Stecker CN 2, CN 3 und CN 13 von der Leiterplatte A/S abziehen.
3. Schrauben ① entfernen und den A/C-Kopf sowie die Feder entfernen.
4. Anschlußdrähte vom A/C-Kopf ablöten und den neuen Kopf einsetzen.
5. Alle Anschlüsse entsprechend Tabelle 3-5 wieder herstellen.
6. Nach Durchführen der Drähte sind diese unterhalb des Lagerbolzenstoppers zu befestigen und danach der A/C Kopf und die Feder. Die Stecker CN 2, CN 3 und CN 13 wieder mit der A/S-Platine verbinden.
7. Videocassette einsetzen und danach die Kopfneigung des A/C-Kopfes einstellen (siehe Abschn. 3.4.4)
8. Cassettenaustauschbarkeit prüfen (siehe Abschn. 3.4.5) und Audio Schaltung abgleichen (siehe Abschn. 4.5).

3.3.4 Pinch Roller (Fig. 3-4)

1. Remove screws② and③ and then the guide plate.
2. Remove E-ring and lift out the pinch roller arm.
3. Install a new pinch roller arm (see section 3.4.1), then the guide plate.
4. Make sure that the middle pole stopper is positioned correctly toward the middle pole (see section 3.4.1).

3.3.5 A/C head (Fig. 3-5)

1. Perform loading without using a video cassette (see section 3.1). After loading, unplug the power supply cable.
2. Remove screw ① then take out the A/C weight.
3. Disconnect CN2, CN3 and CN13 from the A/S board.
4. Remove screws② then take out the A/C head and the head spring.
5. Disconnect the wires from the A/C head, and replace the A/C head.
6. Connect all wires to the new A/C head (see Table 3-5).
7. After passing the wires through, place them under the middle pole stopper, then position the A/C head and the head spring. Connect CN2, CN3 and CN13 to the A/S board. Mount the A/C weight.
8. Adjust the inclination of the A/C head using a video cassette (see section 3.4.4).
9. Check and adjust the interchangeability (see section 3.4.5) and adjust the audio circuit (see section 4.5).

Stecker Nr.	Anschluß Nr.	Drahtfarbe
CN2	5/6	weiß/gelb
CN3	1/2	weiß/rot
CN13	3/4	weiß/gelb

Tabelle 3-5 Audio/Synchronkopfanschlüsse

Connector No.	*Terminal No.*	*Wire Color*
CN2	*5/6*	*White/Yellow*
CN3	*1/2*	*White/Red*
CN13	*3/4*	*White/Yellow*

Table 3-5 *A/C head wiring*

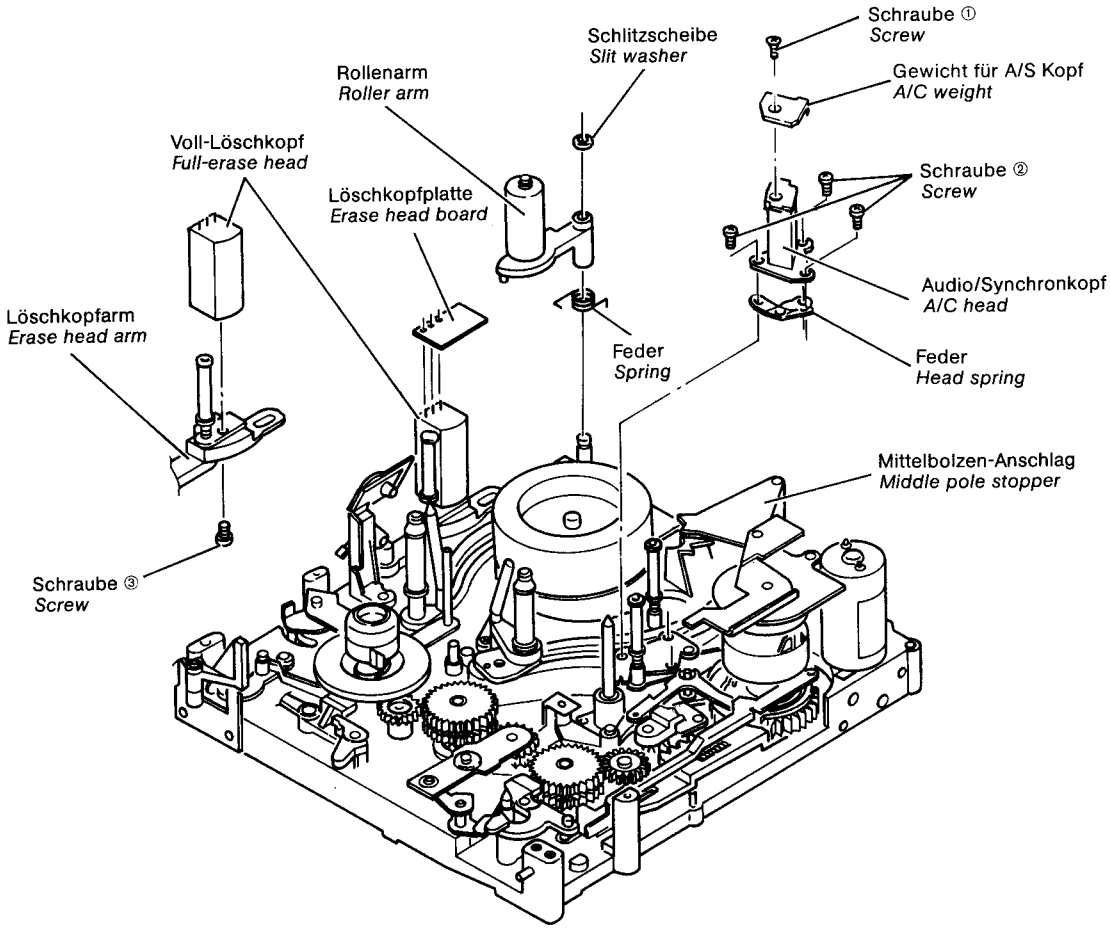


Abb./Fig. 3-5 Audio-Synchronkopf und Voll-Löschkopf
A/C head and full erase head

3.3.6 Voll-Löschkopf (Abb. 3-5)

1. Leiterplatte vom Löschkopf entfernen.
2. Schlitzscheibe entfernen, die Feder ausrasten und den Rollenhebel nach oben hin abnehmen.
3. Den Löschkopfhebel nach außen schwenken und die Schrauben ② entfernen, dann den Löschkopf vom Hebel abnehmen.
4. In umgekehrter Reihenfolge den neuen Löschkopf, den Rollenhebel und die Feder wieder montieren.
5. Danach die Löschkopfplatine wieder an den Vollöschkopf anschließen.
6. Mit Videocassette den Bandtransport am Abwickel-Führungsbolzen prüfen.
7. Falls das Band sich dabei ringelt oder kräuselt, ist der Abwickel-Führungsbolzen in der Höhe nachzustellen (siehe 3.4.4). Die Einstellung muß so erfolgen, daß die Austauschbarkeit von Cassetten sichergestellt ist (siehe Abschn. 3.4.5).

3.3.7 Lademotor (Abb. 3-6)

1. Den Stecker CN 12 von der A/S-Leiterplatte abziehen.
2. Die Schrauben ① und dann die Ladegetriebe-Halterung entfernen.
3. Die Schrauben ② und dann den Lademotor herausnehmen.
4. Den neuen Motor so einsetzen, daß der Aufkleber nach außen zeigt.
5. Haltewinkel einsetzen und den Stecker CN 12 wieder mit der A/S-Platine verbinden.

3.3.6 Full-erase Head (Fig. 3-5)

1. Remove the ERASE HEAD board from the full-erase head.
2. After removing the slit washer, unlock the spring and remove the roller arm upward.
3. Move the erase head arm outward, then remove screw ③. Now remove the full-erase head from the erase head arm.
4. Install a new full-erase head, then mount the roller arm, and hook the spring carefully.
5. Connect the ERASE HEAD board to the full-erase head.
6. Using a video cassette, check the tape motion at the supply guide pole.
7. If the tape curls or wrinkles, adjust the height of the supply guide pole (see section 3.4.4). Check and adjust it for interchangeability (see section 3.4.5).

3.3.7 MC Motor (Fig. 3-6)

1. Disconnect CN12 from the A/S board.
2. Remove screws ① then the loading bracket.
3. Remove screws ② then the MC motor to be replaced.
4. Set the new MC motor in place, with the label out.
5. Fasten the loading bracket in place, and connect CN12 to the A/S board.

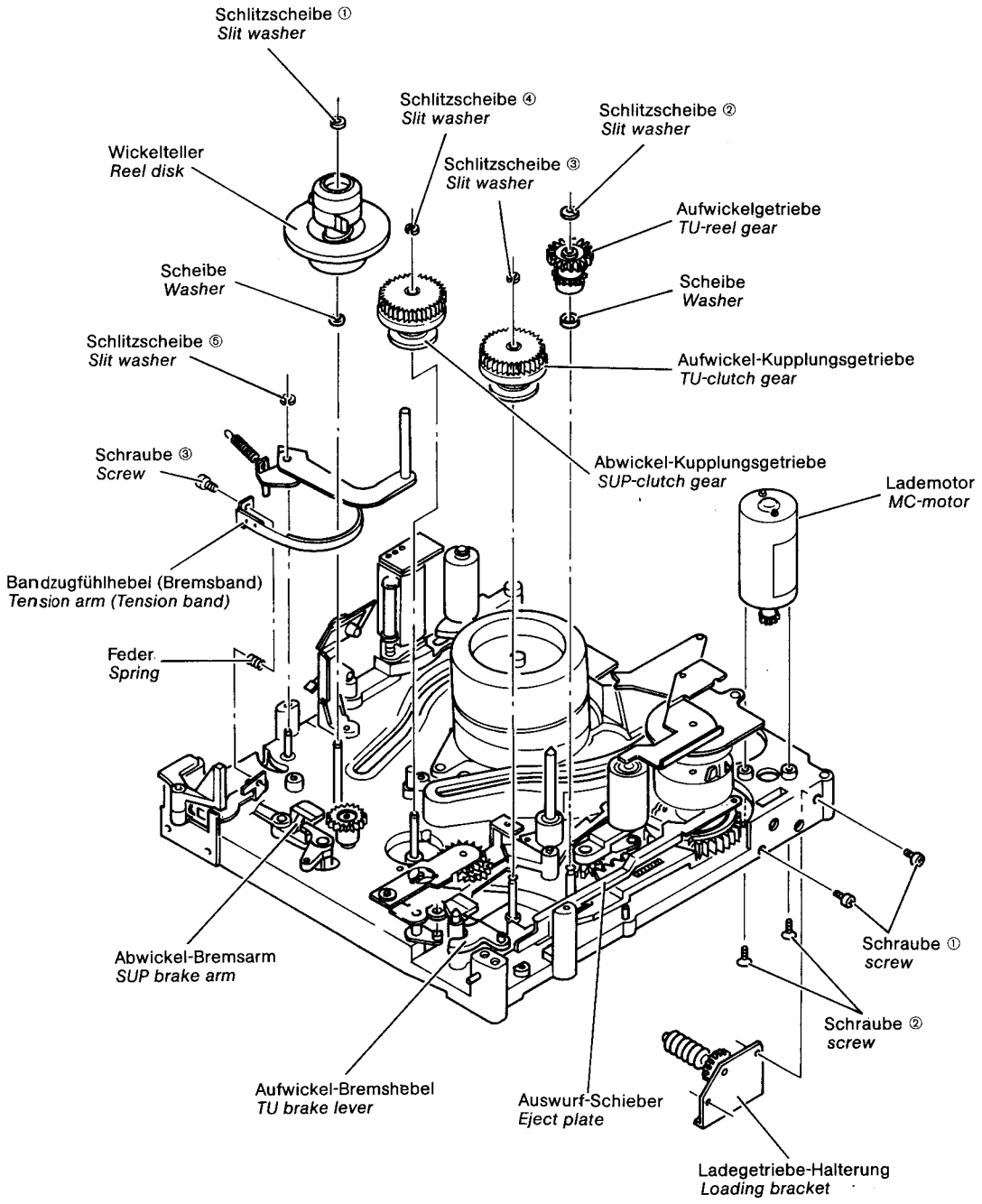


Abb./Fig. 3-6 Lademotor, Wickelteller, Kupplungsgetriebe und Bremsband
MC-motor, Reel disk, Clutch gears and Tension band

3.3.8 Wickelteller (Abb. 3-6)

1. Die Schlitzscheibe ① entfernen und den Wickelteller vorsichtig herausnehmen, damit Unterlegscheiben unterhalb des Wickeltellers nicht verlorengehen.
2. Die Tellerachse mit Alkohol reinigen und dann einen leichten Ölfilm auftragen. Anschließend den neuen Wickelteller einsetzen.
3. Danach ist die Position des Fühlhebels zu prüfen (siehe Abschn. 3.4.2) und dann der Bandzug (siehe Abschn. 3.4.3).

3.3.9 Kupplungs-Getriebe (Abb. 3-6)

- **Aufwickel-Kupplungsgetriebe**

1. Schlitzscheibe ② entfernen und Kupplungsgetriebe vorsichtig herausnehmen, damit keine Unterlegscheiben verlorengehen.
2. Nach dem Entfernen der beiden Schlitzscheiben ③ und ④ kann jetzt das Kupplungsgetriebe herausgezogen werden, wenn der Aufwickel-Bremshebel und die Schiene für FF/REW (schneller Vor/Rücklauf) etwas bewegt werden.
3. Nachdem die Kupplungsachse mit Alkohol gereinigt wurde, diese mit etwas Fett einreiben.
4. Danach das Kupplungsgetriebe in umgekehrter Reihenfolge wieder einsetzen.
5. Nach dem Einbau den Aufwickel-Bandzug prüfen (siehe 3.4.3).

- **Abwickel-Kupplungsgetriebe**

1. Schlitzschraube ① entfernen und danach vorsichtig den Wickelteller herausnehmen, damit keine Scheiben verlorengehen.
2. Schlitzscheibe ⑤ entfernen und dann das Abwickel-Kupplungsgetriebe herausnehmen. Dabei ist der Abwickelbremsarm zu verschieben.
3. Nach Reinigen der Kupplungsachse mit Alkohol, ist diese mit etwas Fett einzureiben.
4. Das neue Abwickel-Kupplungsgetriebe in umgekehrter Reihenfolge wieder einsetzen. **Vorsicht!** Das Bremsband darf unter keinen Umständen verbogen werden.

3.3.10 Bandzug-Fühlhebel (Abb. 3-6)

1. Schlitzscheibe ① entfernen und den Wickelteller vorsichtig, ohne Scheiben zu verlieren, herausnehmen.
2. Schlitzscheibe ⑥ und E-Klemmring entfernen.
3. Die Feder aushaken und den Bandzug-Fühlhebel herausnehmen.
4. Den neuen Fühlhebel in umgekehrter Reihenfolge wieder einsetzen.
5. Danach die Position des Fühlstiftes kontrollieren (siehe 3.4.2) und anschließend Bandzug überprüfen (siehe Abschn. 3.4.3).

3.3.11 Capstan-Motor (Abb. 3-7)

1. Stecker CN 14 von der A/S Leiterplatte abziehen.
2. Capstanriemen vom Capstanmotor abnehmen.
3. Die Schrauben ① entfernen und den Motor herausnehmen.
4. Den neuen Motor in umgekehrter Reihenfolge, mit dem Aufkleber nach außen, einbauen.
5. Capstanriemen reinigen und wieder einsetzen.
6. Danach, entsprechend den Anweisungen unter Abschn. 4.3.3, 4.3.7 und 4.3.8 den Capstan-Servokreis abgleichen.

3.3.12 Antriebsriemen (Abb. 3-7)

1. Schraube lösen und den Capstananschlag entfernen.
2. Nach Lösen der Schraube ② die Capstan-FG-Platte herausnehmen.
3. Den Capstanriemen vom Capstanmotor und dem Schwungrad abnehmen.
4. Einen Schraubenzieher durch das Loch im Schwungrad stecken und den Aufwickelriemen unter gleichzeitiger Drehung des Schwungrades von der Riemenscheibe drücken.
5. Das Schwungrad jetzt vorsichtig herausnehmen, damit keine Unterlegscheiben verlorengehen.
6. Schrauben ③ lösen, die Getriebeplatte etwas verschieben und den alten Riemen herausnehmen.
7. Den neuen Aufwickelriemen und Capstanriemen in umgekehrter Reihenfolge einsetzen.
8. Danach den Capstan mit Alkohol reinigen.

3.3.13 Schleifkontakt (Abb. 3-7)

1. Nach Lösen der Schrauben ④ den Schleifkontakt herausnehmen und mit Alkohol reinigen.
2. Die Kopftrommelachse ebenfalls mit Alkohol reinigen und den Schleifkontakt mit leichtem Druck an der Achsenmitte wieder befestigen.

3.3.8 Reel Disk (Fig. 3-6)

1. Remove slit washer ①, then raise the reel disk to be replaced, being careful not to lose the washer under the reel disk.
2. Clean the reel shaft with alcohol, then apply a light film of oil to the shaft.
3. Set the new reel disk in place.
4. Check the position of tension pole (see section 3.4.2) then the back tension (see section 3.4.3).

3.3.9 Clutch Gears (Fig. 3-6)

- **TU clutch gear**

1. Remove slit washer ②, and then the TU clutch gear by moving both the rod and the eject plate, being careful not to lose the washer.
2. Remove slit washer ③, then pull out the TU clutch gear to be replaced by moving the TU brake lever.
3. After cleaning the clutch shaft with alcohol, apply a little grease to the clutch shaft.
4. Set the new TU clutch gear and the TU reel gear back in place in the reverse order of removal.
5. Check the take-up torque (see section 3.4.3).

- **SUP clutch gear**

1. Remove slit washer ① then the reel disk, being careful not to lose the washer.
2. Remove slit washer ④ then pull out the SUP clutch gear by moving the SUP brake arm.
3. After cleaning the clutch shaft with alcohol, apply a little grease to the clutch shaft.
4. Set the new SUP clutch gear and a reel disk back in place in the reverse order of removal. Be careful not to bend the tension band.

3.3.10 Tension Band (Fig. 3-6)

1. Remove slit washer ① then the reel disk, being careful not to lose the washer.
2. Remove slit washer ⑤ and screw ③, being careful not to drop the compression spring.
3. Remove the spring from the deck then the tension arm to be replaced.
4. Set the new tension arm and the reel disk back in place in the reverse order of removal.
5. Adjust the position of tension pole (see section 3.4.2), then check the back tension (see section 3.4.3).

3.3.11 Capstan Motor (Fig. 3-7)

1. Disconnect CN14 from the A/S board.
2. Remove the capstan belt from the capstan motor.
3. Remove screws① then the capstan motor to be replaced.
4. After passing the wires through, set the capstan motor in place with the label out.
5. After making sure there is no grease or foreign matter on the capstan belt, mount it on the capstan motor.
6. Adjust the capstan system of the servo circuit (see sections 4.3.3, 4.3.7 and 4.3.8).

3.3.12 Belts (Fig. 3-7)

1. Remove screws② then the capstan FG plate.
2. Remove the capstan belt from the capstan motor and the flywheel for replacement.
3. Remove screws③, and then disengage the reel belt by moving the center gear base.
4. Remove screws ④ from top side then the flywheel assembly for replacing the reel belt.
5. Mount the new reel and the capstan belts in the reverse order of removal.

3.3.13 Brush (Fig. 3-7)

1. Remove screws⑤ then the brush and clean the brush with alcohol.
2. After cleaning the drum shaft with alcohol, mount the brush as before.

3.3.14 Trommel-Impulskopf

1. Das Abdeckblech nach Lösen der Schraube ⑤ entfernen.
2. Stecker CN 9 von der M/S-Platte abziehen.
3. Schrauben ⑥ lösen und den Impulskopf herausnehmen.
4. Den neuen Impulskopf in Mittellage der Kopftrommel so weit wie möglich von der Trommel entfernt festsetzen.
5. Die Abdeckplatte wieder einsetzen und den Stecker CN 9 mit der M/S-Platte verbinden.
6. Danach den Trommel-Impulspegel (siehe Abschn. 4.3.1) und den Wiedergabe/Aufnahme-Schaltpunkt (siehe 4.3.4 und 4.3.5) einstellen.

3.3.14 PU Head (Fig. 3-7)

1. Remove screw⑥, then remove the cover sheet.
2. Disconnect CN9 from the M/S board.
3. Remove screws⑦ then the PU head to be replaced.
4. Set the new PU head in place facing the center of the drum as far from the drum as possible.
5. Fasten the cover sheet back in place, and connect CN9 to the M/S board.
6. Adjust the drum pulse level (see section 4.3.1), then the PB/REC switching points (see sections 4.3.4 and 4.3.5).

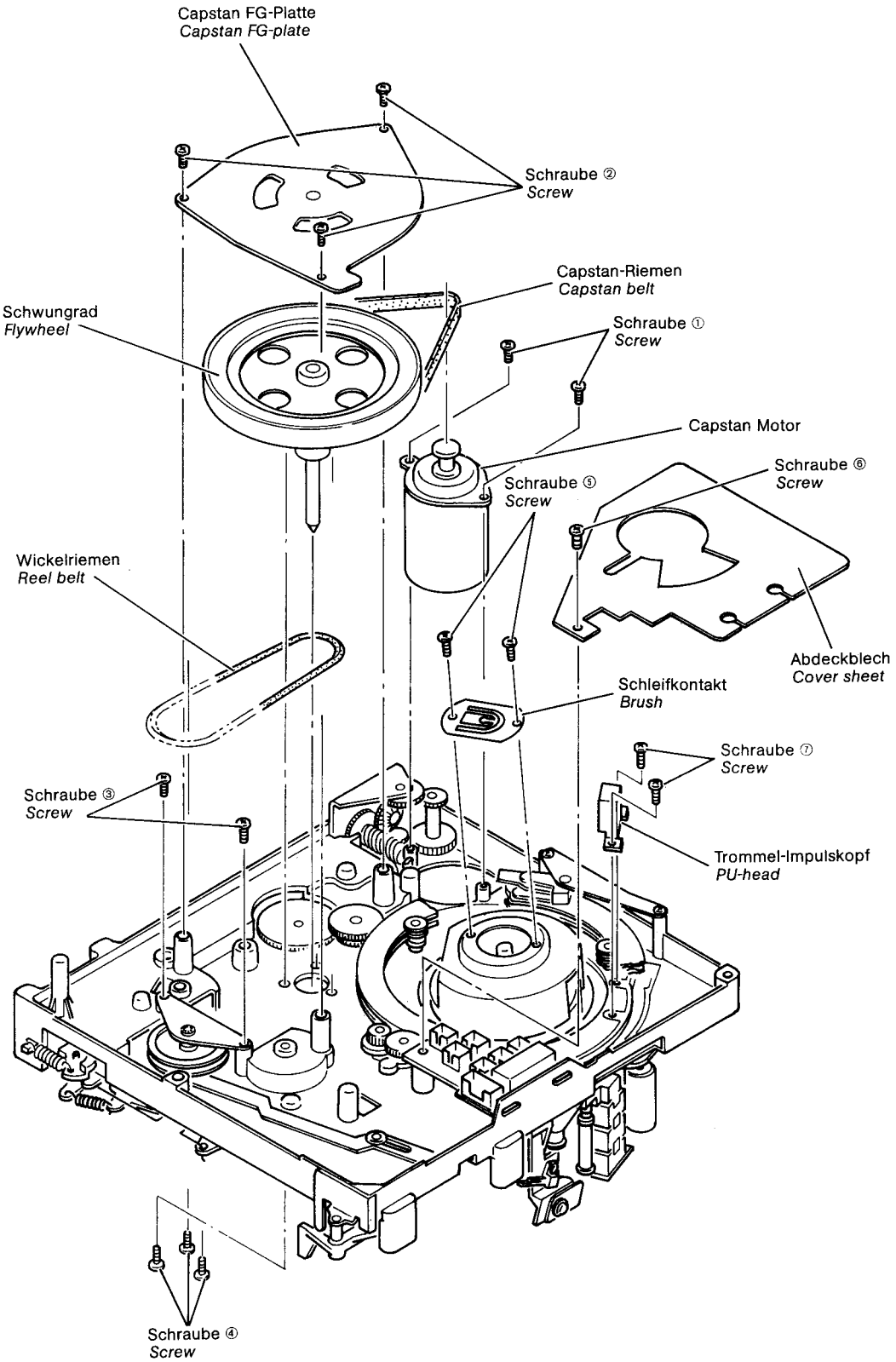


Abb./Fig. 3-7 Capstan-Motor, Riemen, Schleifkontakt und Trommel-Impulskopf
Capstan motor, Belts, Brush and PU-head

3.4 Prüf- und Einstellarbeiten

3.4.1 Einstellhinweise

Falls die nachfolgend aufgeführten Teile ausgetauscht oder in ihrer Lage verändert wurden, müssen diese wieder in ihre ursprüngliche Lage gebracht werden.

1. Ladeschalter

1) Für die Stoppfunktion muß der Ladeschalter entsprechend Abb. 3-8 in Position gebracht werden.

2. Andruckrollen-Arm

1) In Stoppstellung muß der Andruckrollenarm und -hebel wie in der Abb. 3-9 eingestellt sein.

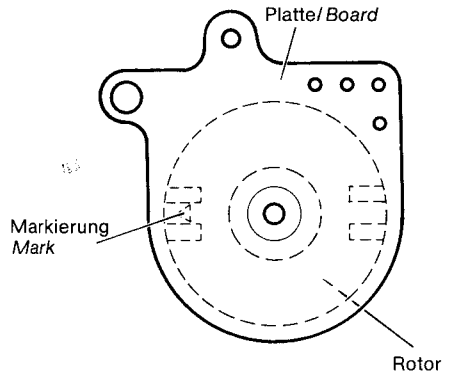


Abb./Fig. 3-8 Ladeschalter
Mode control switch (top view)

3. Ladegetriebe (5)

1) In Stoppstellung muß das Ladegetriebe und die Zahnradscheibe wie in der Abb. 3-10 eingestellt sein.

4. Ladegetriebe (6) und Ring-Zwischenrad (2)

1) In Stoppstellung sollten die Laderinge in der Position entsprechend Abb. 3-11 sein.

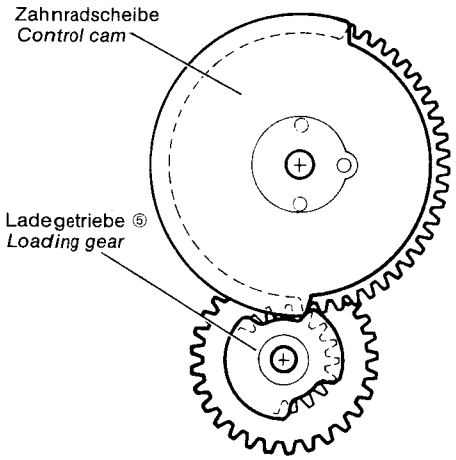


Abb./Fig. 3-10 Ladegetriebe (5)
Loading gear (5) (top view)

5. Mittelbolzen

1) Es ist darauf zu achten, daß beim Passieren des Bandes am Aufwickelbolzenfuß der Mittelbolzen engen Kontakt zum Bolzenstopper hat, besonders in der Endphase des Ladevorgangs. Im Bedarfsfall ist die Position der Verbindungsplatte nachzustellen. Der Aufwickelbolzenfuß darf keine Berührung zum Mittelbolzen haben.

2) Der Mittelbolzen muß beim Anschlag zu beiden Schenkeln des Stoppers engen Kontakt haben. Falls erforderlich, ist die Position des Stoppers einzustellen.

3.4 Checks and Adjustments

3.4.1 Timing Check

If any of the following parts is replaced or removed, you must reposition the part when you put it back.

1. Mode control switch

1) For the Stop mode, the mode control switch should be set as shown in Fig. 3-8.

2. Pinch roller arm

1) In the Stop mode, the pinch roller arm and bar should be positioned as shown in Fig. 3-9.

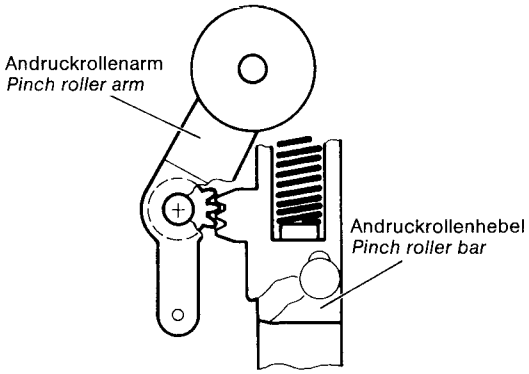


Abb./Fig. 3-9 Andruckrollenarm
Pinch roller arm (top view)

3. Loading gear (5)

1) In the Stop mode, loading gear (5) and the control cam should be positioned as shown in Fig. 3-10.

4. Loading gear (6) and ring idler gear (2)

1) In the Stop mode, the loading rings should be positioned as shown in Fig. 3-11.

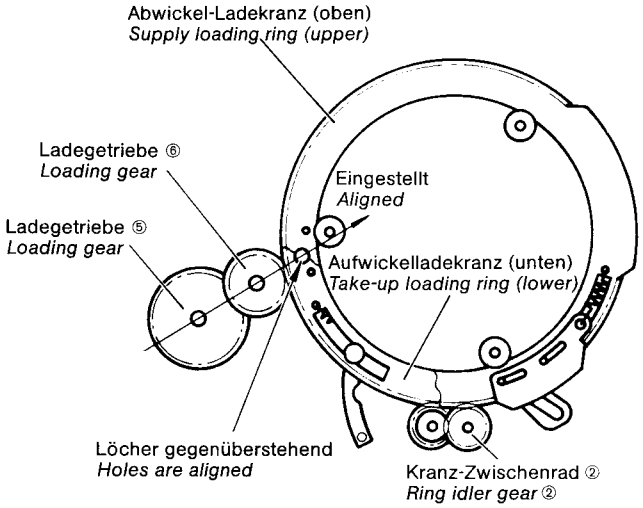


Abb./Fig. 3-11 Laderinge
Loading rings (bottom view)

5. Middle pole

1) Make sure that the middle pole is in close contact with the middle pole stopper while the tape passes through the take-up pole base to the loading end. If necessary, adjust the connector plate position on the bottom. The take-up pole base should not contact the middle pole.

2) Check that the middle pole and middle pole stopper contact at two points when they come together. If necessary, adjust the middle pole stopper position.

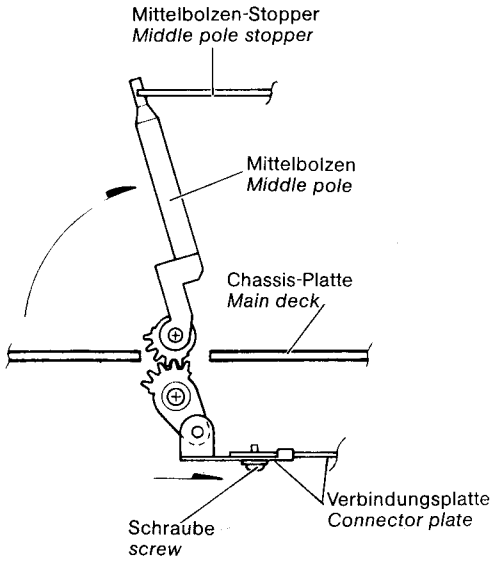


Abb./Fig. 3-12 Mittelbolzen
Middle pole (side view)

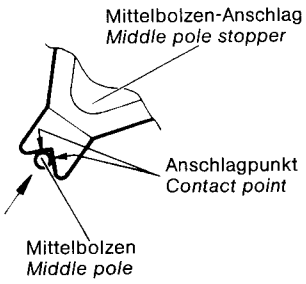


Abb./Fig. 3-13 Mittelbolzen-Stopper
Middle pole stopper (top view)

3.4.2 Einstellen des Bandzug-Fühlhebels

1. Videocassette einlegen und Gerät auf Wiedergabe schalten.
2. Prüfen, ob die linke Kante des Fühlstiftflansches im Bereich A des Löschkopf-Arms liegt.
3. Die Lage des Fühlstifts kann mit der Schraube B justiert werden.

3.4.3 Einstellen des Aufwickel-Drehmoments und Rückstellkraft

1. Bremszug-Meßcassette einlegen und Gerät auf Wiedergabe schalten.
2. Die Pfeile rechts und links auf der Meßcassette markieren die Aufwickel- bzw. die Abwickelkraft.
3. Prüfen, ob der rechte Zeiger der Skala im Bereich zwischen 25-30 anzeigt. Wenn nicht, ist das Aufwickel-Kupplungsgetriebe auszuwechseln (siehe Abschn. 3.3.9). Zusätzlich sollte auch das Abwickel-Kupplungsgetriebe ausgetauscht werden.
4. Prüfen, ob der linke Zeiger der Skala zwischen 20-30 anzeigt. Wenn nicht, ist die Position des Bandfühlhebels zu prüfen (siehe 3.4.2) und gegebenenfalls das Bremsband auszutauschen (siehe Abschn. 3.3.10). Sollte der Zeiger einen größeren Ausschlag nach beiden Seiten haben, so ist der Wickelteller ebenfalls auszuwechseln (siehe Abschn. 3.3.8).

3.4.4 Bandtransport-Kontrolle und Einstellung

Die Bandtransportmechanik ist im Werk exakt eingestellt und benötigt im Normalfall keine nachträgliche Justage. Die nachfolgende Prüfung ist deshalb nur nach besonders hartem Gebrauch oder nach Austausch von mechanischen Teilen der Bandtransportmechanik erforderlich.

- **Überprüfung des Bandlaufs**

1. Videocassette einsetzen und folgende Prüfung durchführen:

1) Gerät in Wiedergabebetrieb schalten und prüfen, ob das Band beim Trommeleinlauf bzw. Trommelauslauf weder zu hoch noch zu niedrig in bezug zur Trommelführung verläuft. Im Fehlerfall sind die Führungsrollen in ihrer Höhe zu justieren.

3.4.2 Adjusting the Tension Pole

1. With a video cassette in the unit, set the unit to the Play mode.
2. Make sure that the left edge of the tension pole flange lies upon the range A of the erase head arm.
3. The tension pole is positioned by turning the screw B.

3.4.3 Checking the Take-up Torque and the Back Tension

1. With a cassette torque meter in the unit, set the unit to the Play mode.
2. The right and left pointers on the cassette torque meter indicate the take-up torque and the back tension.
3. Make sure that the right pointer falls in the range of 25–45. If it is not in this range, replace the TU clutch gear (see section 3.3.9). In addition to replacing it, SUP clutch gear should also be replaced.
4. Make sure that left pointer falls in the range of 20–30. If it is not in this range, check the tension pole position (see section 3.4.2), then replace the tension band (see section 3.3.10). If the pointer fluctuates greatly, replace the reel disk as well (see section 3.3.8).

3.4.4 Checking and Adjusting the Tape Transport System

The tape transport system has been precisely aligned at the factory and normally does not require readjustment. The following check is therefore necessary only in cases of severe usage or when replacing parts affecting the tape transport system.

- **Checking the tape transport system**

1. With a video cassette inserted, check the following.

1) In the Play mode, make sure that tape at the drum entrance and exit is not too high or too low with respect to the drum lead. If not correct, adjust the height of the guide roller.

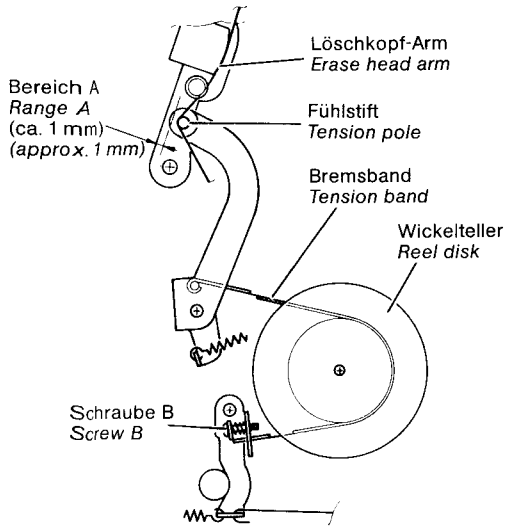


Abb./Fig. 3-14 Bandzug-Fühlstift
Tension pole

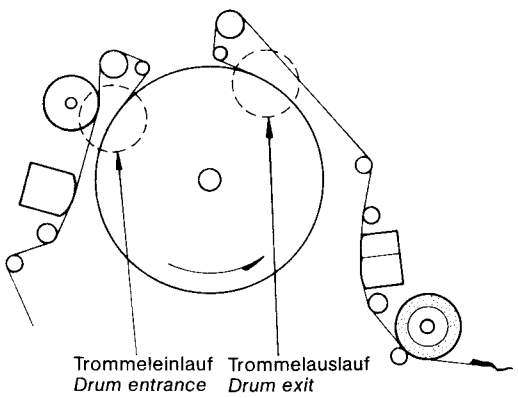


Abb./Fig. 3-15 Trommel Ein- und Auslauf
Drum entrance and exit

2) Im Wiedergabebetrieb muß das Band am Abwickel- bzw. am Aufwickelführungsbolzen ohne Stauchungen und Falten laufen. Im Fehlerfall am Abwickelführungsbolzen, diesen in der Höhe verstellen. Wenn der Fehler am Aufwickelführungsbolzen erscheint, ist die Neigung des Audio-Synchronkopfes zu verändern.

● **Führungsrollen-Höhenjustage**

1. Videocassette einlegen und Recorder auf Wiedergabe schalten.
2. Mit Inbusschlüssel die Höhe der Führungsrollen so einstellen, daß die Bandkante entlang der Führungsrollenkante verläuft.

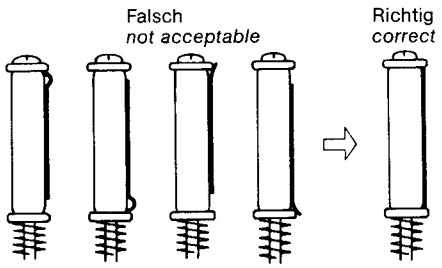


Abb./Fig. 3-16 Bandführungsbolzen
Guide pole

2) In the Play mode, check for tape curling and wrinkling at the supply and take-up guide poles. If fault is found at the supply guide pole, adjust the supply guide pole height carefully. If fault is found at the take-up side guide pole, adjust the A/C head inclination carefully.

● **Adjusting the guide roller height**

1. With a video cassette inserted, set the unit to the Play mode.
2. Using a hex key wrench, adjust the guide roller to cause the tape to travel along the lead.

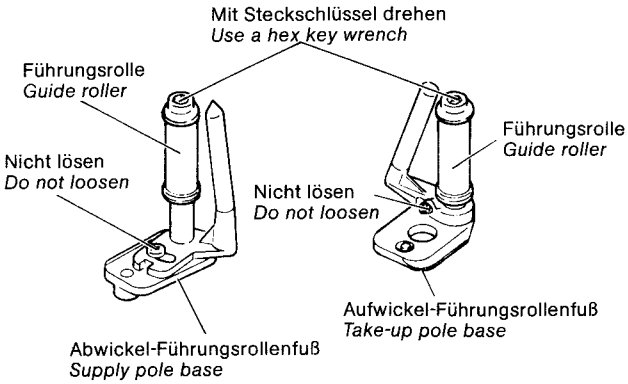


Abb./Fig. 3-17 Führungsrollen
Guide rollers

● **Führungsbolzen-Höhenjustage**

1. Videocassette abspielen
2. Die Schrauben oben auf dem Abwickelführungsbolzen so einstellen, daß die untere Bandkante am unteren Flansch glatt verläuft.

● **Kopfneigung einstellen**

1. Cassette einlegen und Recorder auf Wiedergabe schalten.
2. Die Audio/Synchronkopfschrauben (A) und (B) wechselweise so verstellen, daß die untere Bandkante entlang dem unteren Flansch des Aufwickelbolzens verläuft. Nicht die Aufwickelführungsbolzen-Höhe verändern.
3. Aufwickel-Führungsbolzen (2) prüfen. Falls sich das Band daran staucht oder Falten bildet, ist die Mutter des Bolzens so zu justieren, daß die untere Bandkante am unteren Bolzenflansch (2) glatt verläuft.

● **Adjusting the supply guide pole height**

1. With a video cassette inserted, set the unit to the Play mode.
2. Turn the screw at the top of the supply guide pole to adjust the bottom edge of the tape along the lower flange of the guide pole.

● **Adjusting the inclination of the A/C head**

1. With a video cassette inserted, set the unit to the Play mode.
2. Turn A/C head screws Ⓐ and Ⓑ alternately to set the bottom edge of the tape along the lower flange of the take-up guide pole. Do not adjust the height of the take-up guide pole.
3. Observe the take-up guide pole (2). If a tape curling or wrinkling is noted, turn the nut on top of the take-up guide pole (2) to adjust the bottom edge of the tape along the lower flange of the take-up guide pole (2).

3.4.5 Bandlaufprüfung und Einstellung

Vor Benutzung der Testcassette eine normale Cassette einlegen und den richtigen Bandlauf überprüfen.

● **Prüfung und Einstellung der FM-Signalform**

1. Oszilloskop an TP 1 (PB FM OUT) der Y/C Leiterplatte anschließen. Externe Synchronsignalquelle an TP 13 (DRUM FF) der M/S Platine anschließen.
2. Abgleichband MH-C2 (Grautreppe) abspielen.

1) Mit Triggerschalter des Oszilloskops auf (-), die FM-Signalform in jedem Kanal prüfen.

3.4.5 Interchangeability Checks and Adjustments

Before using an alignment tape, use a regular tape and confirm correct tape transport operation.

● **Checking and adjusting the FM waveform**

1. Connect an oscilloscope to the Y/C board TP1 (PB FM OUT), and an external synchronous signal source to the M/S board TP13 (SW PULSE).
2. Using alignment tape MH-C2, reproduce the stairstep signal.

1) Set the oscilloscope trigger for negative (−) slope, and check the FM waveform for each channel.

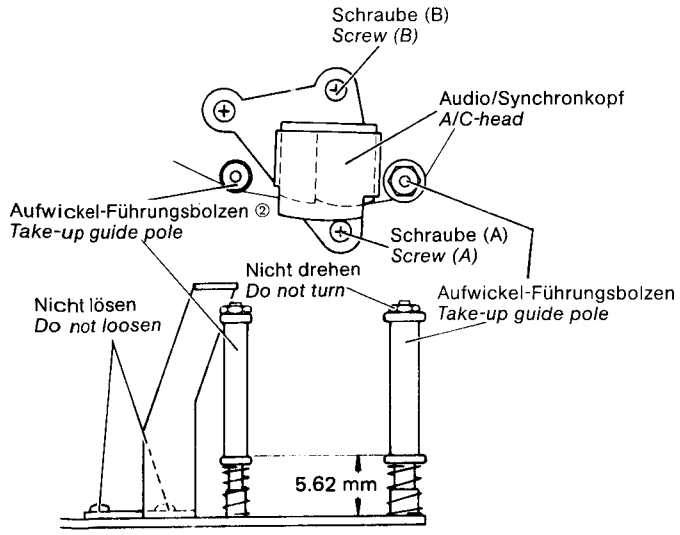


Abb./Fig. 3-18 Audio/Synchronkopf
A/C-head

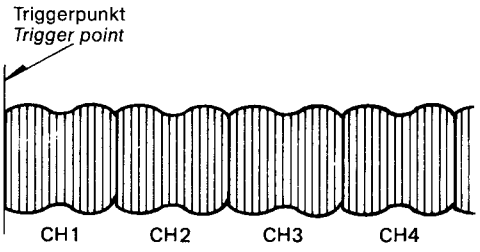


Abb./Fig. 3-19 FM-Signalformen
FM-waveforms

2) Den Spurlageregler (Tracking) drehen, dabei muß sich eine lineare Veränderung der FM-Signalform im Kanal CH-1 ergeben.

2) Turning the tracking knob, observe the FM waveform on CH-1 to make sure that it changes linearly.

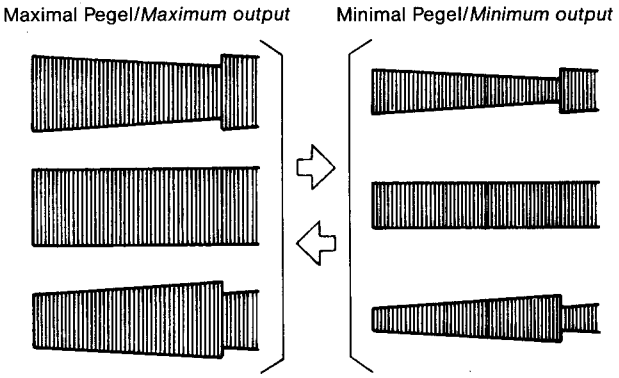


Abb./Fig. 3-20 Standard Signalform Varianten
Standard waveform variation

3) Falls sich die FM-Signalform am Trommeleinlauf wie in Abb. 3-21 verändert, ist die Abwickel-Führungsrolle auf linearen Verlauf der Signalform einzustellen.

4) Verändert sich die Signalform am Trommelauslauf, wie in Abb. 3-22 gezeigt, dann ist die Aufwickel-Führungsrolle auf linearen Verlauf der Signalform einzustellen.

3) If the FM waveform at the drum entrance changes as shown in Fig. 3-21, adjust the supply guide roller so that the change is linear.

4) If the FM waveform at the drum exit changes as shown in Fig. 3-22, adjust the take-up guide roller so that the change is linear.

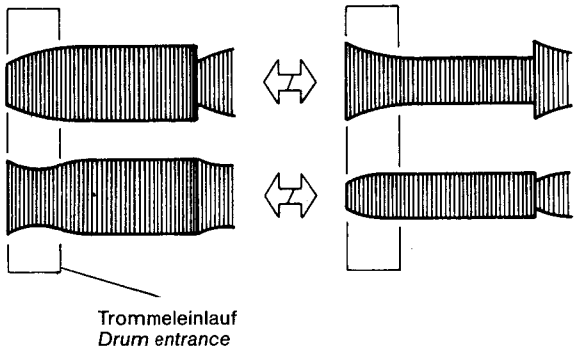


Abb./Fig. 3-21 Signalformen am Trommeleinlauf
Waveform variation at drum entrance side

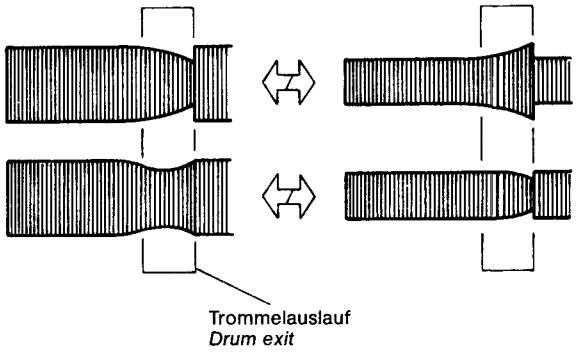


Abb./Fig. 3-22 Signalformen am Trommelauslauf
Waveform variation at drum exit side

5) Beim Einstellen der Signalform ist gleichzeitig darauf zu achten, daß sich das Band an den Führungsbolzen weder staucht noch Falten bildet. Im Bedarfsfall vorsichtig den Abwickelführungsbolzen nachjustieren, falls sich der Fehler am Abwickelbolzen zeigt. Erscheint der Fehler am Aufwickelführungsbolzen, so ist die Neigung des Audio-Synchronkopfes und die Höhe des Aufwickelführungsbolzens (2) nachzustellen.

6) Wird mit dem Spurlageregler die Spur CH-1 auf maximale Signal-Ausgangsspannung eingestellt, so müssen sich zwischen der Signalmitte (b), dem Trommeleinlauf (c) und dem Trommelauslauf (d) folgende Bedingungen ergeben:

5) In addition to adjusting the waveforms, check the tape for curling and wrinkling caused by guide poles. If fault is found at the supply guide pole, carefully adjust the supply guide pole height. If fault is found at the take-up side, carefully adjust the A/C head inclination and take-up guide pole (2) height as necessary.

6) When adjusting the tracking knob for maximum CH-1 output, make sure that central output (b), drum entrance output (c), and drum exit output (d) to the maximum output (a) all meet following requirements:

$$\frac{b}{a} \geqq 0{,}7 \qquad \frac{c}{a} \geqq 0{,}5 \qquad \frac{d}{a} \geqq 0{,}5$$

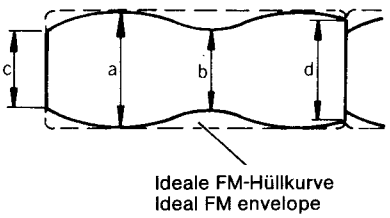


Abb./Fig. 3-23 FM-Signalform (max. Ausgangs-Spannung)
FM waveform (Maximum output)

7) Prüfen, ob auch die FM-Signalformen der Spuren CH-2 bis CH-4 die o. a. Bedingungen erfüllen.

7) Also make sure that the FM waveforms for CH-2 through CH-4 meet the above requirements.

- **Audio-Synchronkopf einstellen**

1. Oszilloskop an TP 2 (AUDIO OUT) der A/S-Leiterplatte anschließen.
2. Abgleichband MH-C2; 6 kHz-Tonsignal abspielen (Grautreppenabschnitt).

1) Mit Schraube (C) Azimuth und maximale Ton-Ausgangsspannung einstellen.

2) Durch gleichmäßiges Verdrehen (in kleinen Schritten) der drei Schrauben (A), (B) und (C) die Kopfhöhe auf maximales Ton-Ausgangssignal einstellen.

- **Audio-Synchronkopf-Phaseneinstellung**

1. Oszilloskop an TP1 (PB FM OUT) der Y/C-Leiterplatte anschließen. Extern – Synchronsignaleingang mit TP13 (DRUM FF) der M/S-Leiterplatte verbinden.
2. MH-C2 Grautreppe wiedergeben.

1) Triggerung des Oszilloskops auf (-) einstellen und die FM-Signalform der Spur CH-1 beobachten.

2) Spurlageregler in (AUTO) Position (Raststellung).

3) Die Schrauben (D) und (E) lösen und den Audio-Synchronkopf in Richtung zum Capstan verschieben.

4) Den A/S-Kopf danach langsam in Pfeilrichtung schieben und beim Erreichen des ersten Maximums von CH-1 die Schrauben (D) und (E) festdrehen.

5) Durch Drehen des Spurlagereglers feststellen, ob in der Raststellung maximale Signalspannung vorhanden ist. Falls nicht, ist die vorangegangene Einstellung zu wiederholen.

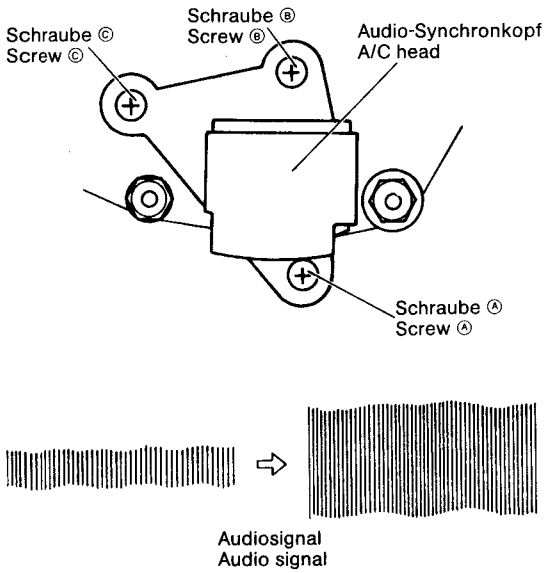


Abb./Fig. 3-24 Audio-Synchronkopf-Einstellung
A/C head adjustment

- **Endprüfung**

1. Oszilloskop an TP1 (PB FM OUT) der Y/C-Leiterplatte anschließen und extern mit TP13 (DRUM FF) der M/S-Leiterplatte triggern.

1) Videocassette einsetzen, Video- bzw. Fernsehsignal aufnehmen und wiedergeben.

2) Prüfen, ob sämtliche FM-Signalformen bei maximaler Ausgangsspannung denen in Abb. 3-23 entsprechen und ob die vorgegebenen Werte eingehalten werden. Das Maximum der Ausgangsspannung muß in der Raststellung des Spurlagereglers liegen. Falls nicht, muß die Spurlage-Voreinstellung (preset) des Servokreises durchgeführt werden (siehe Abschn. 4.3.6).

2. Servoschaltung prüfen und abgleichen (siehe 4.3).
3. Y/C und Vorverstärker-Schaltung (siehe 4.4).
4. Abgleich der Audio-Schaltkreise (siehe 4.5).

- **Adjusting the audio/control head**

1. Connect an oscilloscope to the A/S board TP2 (AUDIO OUT).
2. Using alignment tape MH-C2, reproduce the 6-kHz audio signal (stairstep segment).

1) Turn screw © to adjust the azimuth, and to maximize the audio output.

2) Turn screws Ⓐ, Ⓑ, and © equally by small amounts to adjust the A/C head height for maximum audio output.

- **Adjusting the control head phase**

1. Connect an oscilloscope to the Y/C board TP1 (PB FM OUT), and an external synchronous signal source to the M/S board TP13 (SW PULSE).
2. Using alignment tape MH-C2, reproduce the stairstep signal.

1) Set the oscilloscope trigger for negative (–) slope, and observe the FM waveform for CH-1.

2) Set the tracking knob to the center detent (click-stopped) position (AUTO).

3) Loosen screws Ⓓ and Ⓔ and move the A/C head toward the capstan.

4) Slowly move the A/C head in the indicated direction, then tighten screws Ⓓ and Ⓔ to fix the A/C head (the FM waveform output for CH-1 should be at the first peak).

5) Turn the tracking knob to make sure that the FM waveform output is maximized at the center detent (click-stopped) position. If not satisfactory, repeat the above adjustments.

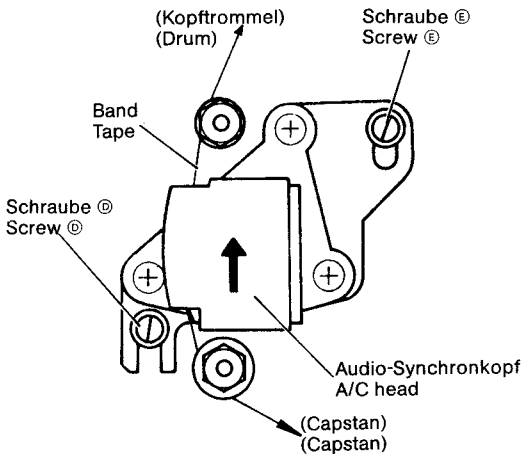


Abb./Fig. 3-25 Audio-Synchronkopf Phaseneinstellung
Control head phase adjustment

- **Final check**

1. Connect an oscilloscope to the Y/C board TP1 (PB FM OUT), and an external synchronous signal source to the M/S board TP13 (SW PULSE).

1) With a video cassette inserted, record and reproduce a video or TV signal.

2) If the FM waveform for each channel at maximum output are as shown in Fig. 3-23, check that all FM waveforms are within specification. If the center detent position of the tracking knob does not produce maximum output, the tracking preset in the servo circuit must be made (see section 4.3.6).

2. Check and adjust the servo circuit (see section 4.3), Y/C and preamplifier circuits (see section 4.4).
3. Adjust the audio circuit (see section 4.5).

4. Elektrische Einstellungen

4.1 Elektrische Einstellungen – VTR

4.1.1 Vorsichtsmaßnahmen
Elektrische Einstellungen sind allgemein nach dem Austausch verschlissener mechanischer Teile oder Videoköpfe erforderlich. Aufgrund der zusammenhängenden Schaltungen ist es bei Störungen sehr wichtig, das elektronische System zu überprüfen und mit Hilfe der Meßgeräte alle Einstellungen methodisch neu vorzunehmen.
Dort, wo alle erforderlichen Meßgeräte nicht sofort verfügbar sind, sind die internen Kontrolleinstellungen nicht unnötig zu verstellen. Überlassen Sie derartige Reparaturen und Einstellungen dem zugelassenen Service-Center.

4.1.2 Erforderliche Meßgeräte

1) TV, Farbmonitor
2) Oszilloskop (Zweikanal mit Verzögerung)
3) Signalgenerator (Farbbalken u. Grautreppe)
4) Frequenzzähler
5) Audio-Tester
6) Geregeltes Gleichstromnetzteil
7) Digital-Voltmeter
8) Ersatz-Videokassette (EC-30) zur Überprüfung von Aufzeichnung und Wiedergabe
9) Abgleichband (MH-C2)
10) Verlängerungskabelsatz
11) Y/C Separator* hilfreich, falls erhältlich
12) Schaltkasten
13) Genormte Werkzeuge

4. Electrical Adjustments

4.1 VTR Electrical Adjustments

4.1.1 Precautions
Electrical adjustments are generally necessitated after replacing worn mechanical parts or video heads. Due to the interrelationships among the various circuits, in event of malfunction, it is important to perform electrical system checks and adjustments methodically with the aid of the proper test instruments.
During field service, where a complete range of test equipment is not immediately available, avoid unnecessarily disturbing the internal control settings. Refer such repairs and adjustments to an authorized (factory) service center.

4.1.2 Required Test Equipment

1) Color monitor-TV
2) Oscilloscope (dual trace with delay function)
3) Signal generator (color bar and stairstep)
4) Frequency counter
5) Audio tester
6) Regulated DC power supply
7) Digital voltmeter
8) Spare video cassette (EC-30) for recording and playback checks
9) Alignment tape (MH-C2)
10) Patch cord
11) Y/C separator *Convenient if available
12) Switch box
13) Standard electronic service tools

4.1.3 Spezifikationen-Abgleichband (MH-C2) **4.1.3 Alignment tape specifications (MH-C2)**

Teil *Segment*	Spielzeit *Playback Time*	Video-Signal *Video Signal*	Audio-Signal *Audio Signal*	Anwendung *Applications*
1	3 min	(ohne) *(none)*	(ohne) *(none)*	
2	5 min	Grautreppe *Stairstep*	6 kHz	● Wiedergabe Prüfung und Abgleich *Playback checks and adjustments* ● Servo-Schaltung Test *Servo circuit checks and adjustments* ● Audiokopf Azimuth Einstellung *Audio head azimuth adjustments*
3	3 min	(ohne) *(none)*	3 kHz	● Bandgeschwindigkeits-Test *Tape speed checks* ● Tonhöhenschwankungs-Test *Wow and flutter checks*
4	6 min	Farbbalken *Color bars*	1 kHz	● Audio bzw. Videosignal-Wiedergabe-Test und Abgleich *Video signal playback circuit checks and adjustments* *Audio signal playback circuit checks and adjustments*
5	2 min	HF-Pegel *RF sweep*	(ohne) *(none)*	● Kopfresonanz-Abgleich *Video head resonance and Q adjustments* ● Frequenz Marken 2,0, 4,0, 5,0 MHz *Markers: 2.0, 4.0, 5.0 MHz*

4.1.4 Schaltkastenanschlüsse
Schaltkasten gem. Abb. 4-1-1 anschließen. Hierdurch ist ein unabhängiger VTR Betrieb möglich.

4.1.4 Switch Box Connection
Connect the switch box as indicated in Fig. 4-1-1. This will allow independent operation of the VTR section.

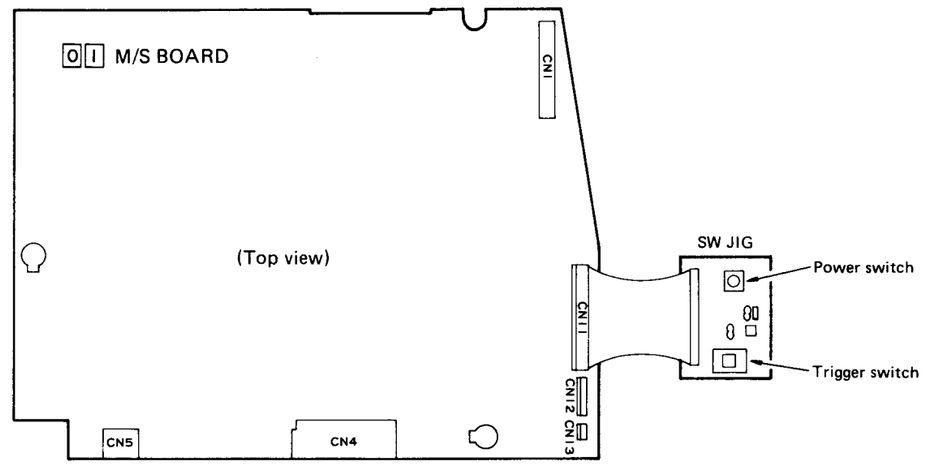


Abb./Fig. 4-1-1 Anschluß des Schaltkastens
Standard connection of SW Box

4.1.5 Anschluß des Y/C-Separators
Normalerweise liefert der Kamerateil getrennt Luminanz(Y)- und Chrominanz(C)-Signale direkt an den VTR-Teil. Daher ist im VTR kein Trennkreis enthalten. Der Y/C-Separator ermöglicht die Überleitung eines Test-Signals zum VTR ohne Kamerateil. Anschluß gem. Abb. 4-1-2 durchführen.

4.1.5 Y/C Separator Connection
Ordinarily, the camera section supplies separated luminance (Y) and chrominance (C) signals directly to the VTR section. Consequently, a separator circuit is not included in the VTR. The Y/C separator allows connection of a signal generator signal to the VTR in absence of the camera section. Perform connection as shown in Fig. 4-1-2.

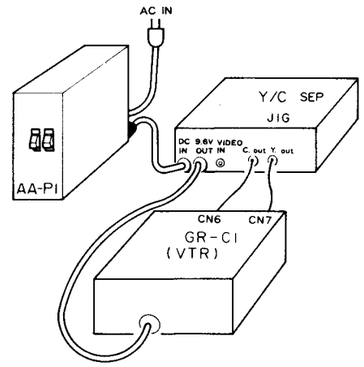


Abb./Fig. 4-1-2 Anschluß des Y/C Separators
Standard connection of Y/C separator

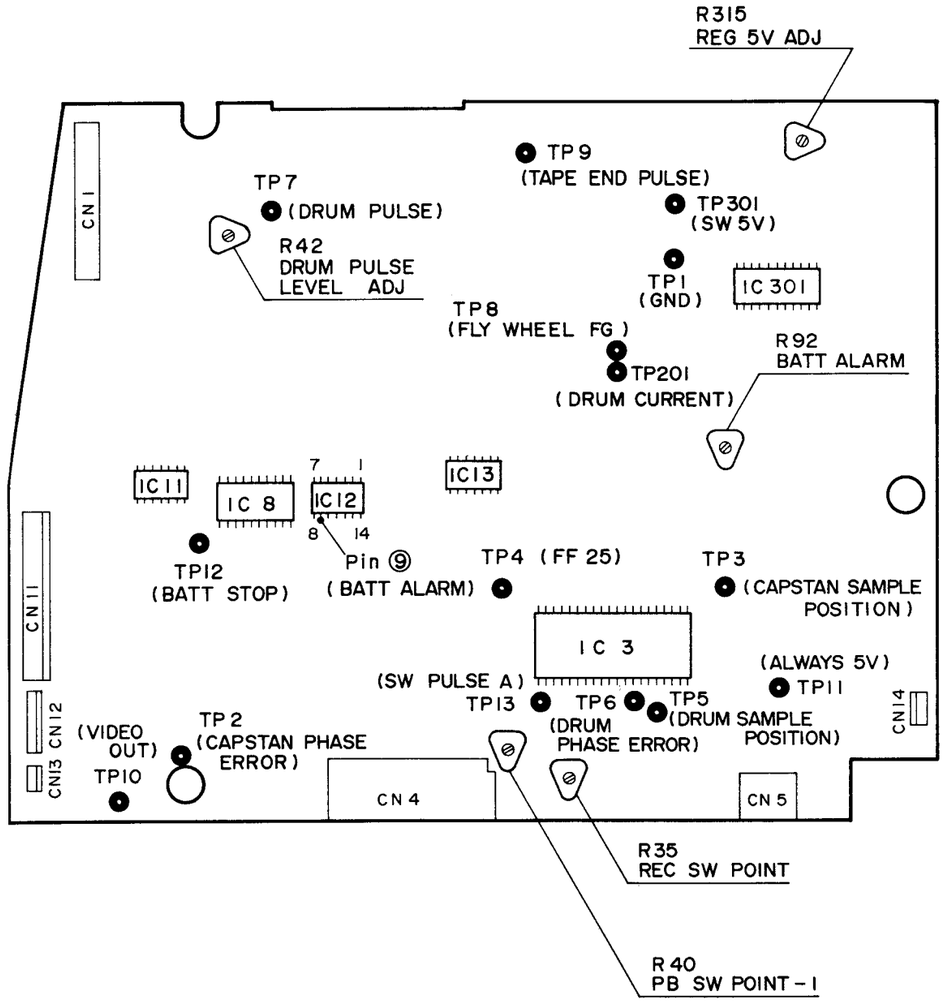
4.1.6 Überprüfung des Videosignal-Eingangs

1. Signaleingang von der Kamera zu VTR
1) Ordnungsgemäße Einstellung des Kamerateils überprüfen
2) Burst-Pegel 0,2 V ss
Überprüfung an TP9 (CHROMA OUT) der CAMERA VIDEO-Platte
3) Y-Stufe 1,0 V ss
Aufnehmen eines Farbbalkentestbildes, das die Bildfläche voll ausfüllt. Anschließen des Oszilloskops an TP8 (Y OUT) der CAMERA VIDEO-Platte und Einstellen der Blende auf 1,0 V ss von Sync Tip zur Weißspitze.
2. VTR Eingangssignal über Y/C Separator
1) Anschließen gem. Abb. 4-1-2
2) Burst Pegel 0,2 V ss
Siehe auch Betriebsanleitungen für Y/C Separator
3) Y auf 1,0 V ss
Siehe auch Betriebsanleitung für Y/C Separator.

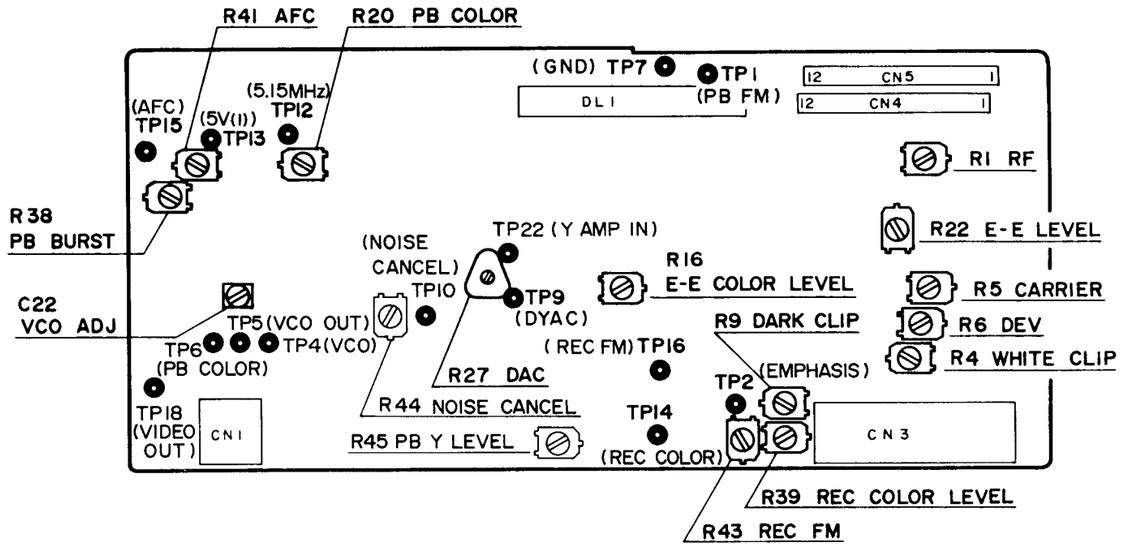
4.1.6 Video Signal Input Checks

1. Signal input from camera to VTR
1) Confirm that the camera section has been properly adjusted.
2) Burst level 0.2 Vp-p (peak-to-peak)
Check at TP9 (CHROMA OUT) of the CAMERA VIDEO board.
3) Y level 1.0 Vp-p
Pick up a color bar pattern which completely fills the picture area. Connect oscilloscope to TP8 (Y OUT) of the CAMERA VIDEO board and adjust the lens iris for 1.0 Vp-p from sync tip to white peak.
2. VTR input signal via Y/C separator
1) Connect as shown in Fig. 4-1-2
2) Burst level 0.2 Vp-p
Refer to the Y/C separator operating instructions.
3) Y level 1.0 Vp-p
Refer to the Y/C separator operating instructions.

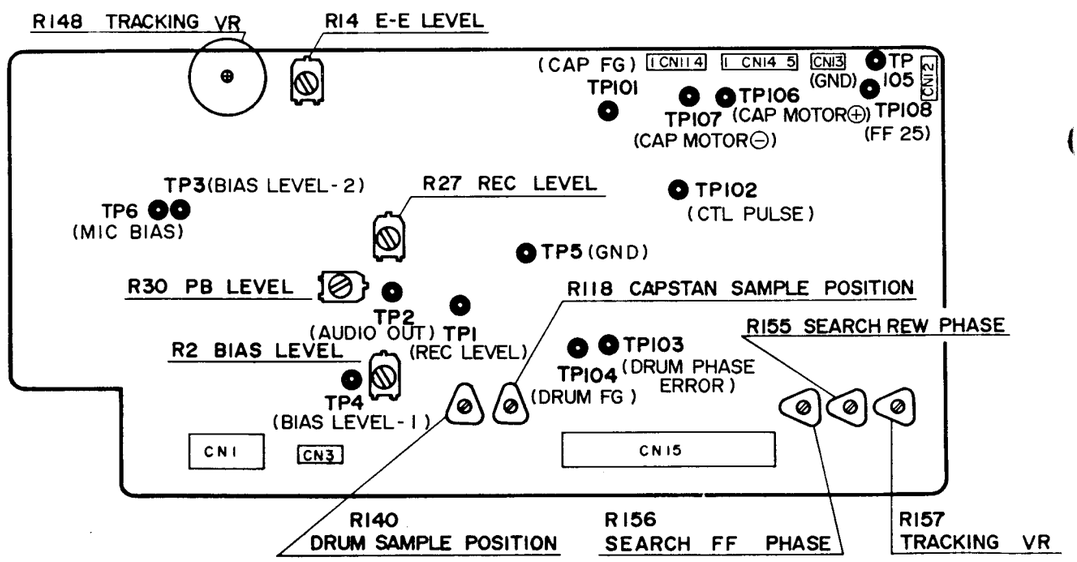
01 M/S BOARD



02 Y/C BOARD



04 A/S BOARD



4.2 Schaltregler und Mechacon-Kreis – Switching regulator and mechacon circuits

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
1	5 V Schaltregler *Switching 5 V Power*	REC Modus ohne Eing.-Signal *REC mode without input signal*	TP301 (SW 5 V) TP1 (GND) ⊡⊡ M/S	R315 ⊡⊡ M/S	1. Digitalvoltmeter zwischen TP301 und TP1 (GND) schalten. 2. R315 auf 5 V ± 0,1 V einstellen. *1. Connect digital voltmeter between TP301 and TP1 (GND).* *2. Adjust R315 to obtain 5 V ± 0,1 V.*
2	Batterie Alarm *Battery Alarm*	REC Modus ohne Kamera *REC mode without camera*	IC12 pin 9 ⊡⊡ M/S	R92 ⊡⊡ M/S	1. Im Aufzeichnungsmodus 9,2 V DC an BATT Terminal eingeben. 2. Oszilloskop mit IC12, Pin 9 verbinden. R92 derart einstellen, daß Potential von „LOW" (L) auf „HIGH" (H) wechselt. (Oszillation tritt am Wendepunkt ein). 3. Im Aufzeichnungsmodus die Spannung von 12 V auf 9,2 ± 1 V verringern. Die Batteriealarmanzeige am Bandzähler muß aufflackern. Siehe Abb. 4-2-1 *1. In Recording mode, supply DC 9.2 V to BATT terminal.* *2. Connect oscilloscope to IC12 pin 9. Adjust R92 to the point that potential changes from Low (L) to High (H). (Oscillation occurs at the change point.)* *3. In the Recording mode, vary the power supply input from 12 V to 9.2 ± 0.1 V. Confirm that the battery alarm graphic of the tape counter flashes. See Fig. 4-2-1.*
3	Batterie Stop *Battery Stop*	REC Modus Eingangs-signal zusätzl. möglich *REC mode input signal optional*			1. Im Aufzeichnungsmodus ist die Stromzufuhr unterbrochen, wenn die Spannung von 12 V auf 8,8 ± 0,1 V verringert wird. *1. In the Recording mode, power is turned off when power voltage is varied from 12 V to 8.8 ± 0.1 V.*

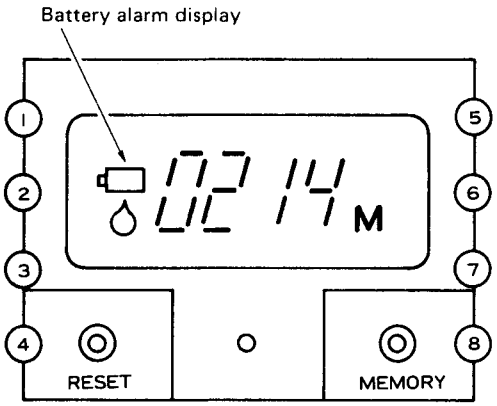
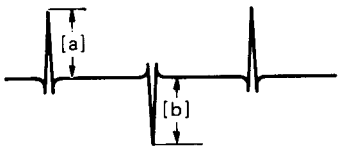
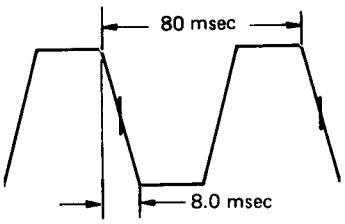
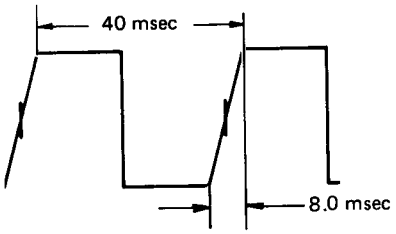
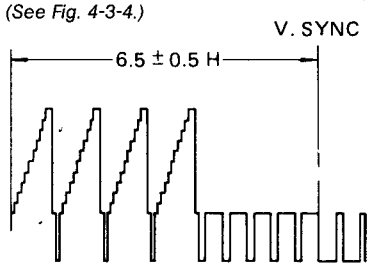
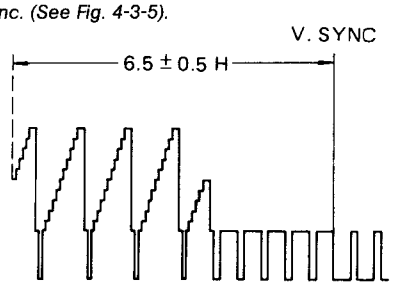


Abb./Fig. 4-2-1 Bandzählwerk
Tape counter display

4.3 Servokreis – Servo circuit

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
1	Trommel-impuls *Drum pulse*	Play MH-C2 Farbbalken Servo einge-rastet *Play MH-C2 Color bar Servo locked*	TP 7 (DRUM PULSE) 0[1] M/S	R42 0[1] M/S	1. Oszilloskop mit TP7 verbinden. R42 derart einstellen, daß der pos. Impuls (a) aus Abb. 4-3-1 0,4 ± 0,1 V ist. 2. Überprüfen, ob der neg. Impuls (b) aus Abb. 4-3-1 0,4 ± 0,1 V beträgt. *1. Connect oscilloscope to TP7. Adjust R42 so that positive pulse ([a] of Fig. 4-3-1) becomes 0.4 ± 0.1 V.* *2. Check that negative pulse ([b] of Fig. 4-3-1) is 0.4 ± 0.1 V.*  **Abb./Fig. 4-3-1**
2	Trommel-Sampling Drum sampling position	Play MH-C2 Farbbalken Play MH-C2 Color bar	TP5 (DRUM SAMPLE POSITION) 0[1] M/S TP103 (DRUM PHASE ERROR) 0[4] A/S	R140 0[4] A/S	1. Oszilloskop mit TP5 verbinden. R140 einstellen, daß der Sampling-Impuls etwa im Zentrum der abfallenden Trapezseite liegt. *1. Connect oscilloscope to TP5. Adjust R140 so that sampling pulse is positioned at roughly the center of the trapezoid falling slope.*  **Abb./Fig. 4-3-2** 2. Digitalvoltmeter an die A/S-Platte bei TP 103 anschließen. R140 auf 2,5 ± 0,1 V einstellen. *2. Connect digital voltmeter to A/S board TP103. Adjust R140 to obtain 2.5 ± 0.1 V.*
3	Capstan-Sampling *Capstan sampling position*	Play MH-C2 Farbbalken *Play MH-C2 Color bar*	TP3 (CAPSTAN SAMPLE POSITION) 0[1] M/S TP2 (CAPSTAN PHASE ERROR) 0[1] M/S	R118 0[4] A/S	1. Oszilloskop mit TP3 verbinden. R118 derart einstellen, daß sich der Sampling-Impuls etwa im Zentrum der ansteigenden Trapezseite befindet. *1. Connect oscilloscope to TP3. Adjust R118 so that sampling pulse is positioned at roughly the center of the trapezoid rising slope.*  **Abb./Fig. 4-3-3** 1. Digitalvoltmeter an TP2 anschließen. R118 auf 2,5 V ± 0,1 V einstellen. *1. Connect digital voltmeter to TP2. Adjust R118 to obtain 2.5 ± 0.1 V.*

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
4	PB-Schaltpunkt *P.B. switching point*	Play MH-C2 Grautreppe *Play MH-C2 Stairstep*	TP10 (VIDEO OUT) TP4 (FF30) EXTERNAL TRIGGER 01 M/S	R40 01 M/S	1. Oszilloskop extern triggern durch Signal von TP4 der 01 M/S-Platte. Triggerpolarität auf (–) minus. 2. Oszilloskop mit TP10 verbinden und MH-C2 spielen. 3. R40 einstellen zur Positionierung des Triggers auf 6,5 H ± 0,5 H vor V sync. (Abb. 4-3-4). *1. Trigger oscilloscope externally with the signal from TP4 of the 01 M/S board. Set oscilloscope for minus (–) slope.* *2. Connect oscilloscope to TP10 and play MH-C2.* *3. Adjust R40 to position the trigger 6.5 H ± 0.5 H prior to V sync. (See Fig. 4-3-4.)*  **Abb./Fig. 4-3-4** 4. Triggerpolarität auf (+) plus. 5. Triggerpunkt muß bei 6,5 H ± 0,5 H vor V sync. liegen. (Abb. 4-3-5). *4. Set oscilloscope for plus (+) slope.* *5. Check that trigger point is positioned 6.5 H ± 0.5 H prior to V sync. (See Fig. 4-3-5).*  **Abb./Fig. 4-3-5**
5	Aufzeichnungs-schaltpunkt *Recording switching point*	Aufnahme Grautreppe *Recording mode* *Stairstep*	TP10 (VIDEO OUT) TP13 (SW-A PULSE) EXTERNAL TRIGGER 01 M/S	R35 01 M/S	1. Oszilloskop extern triggern mit Signal aus TP13 der 01 M/S-Platte. 2. Triggerpolarität auf (+) plus. 3. Aufzeichnungsmodus einstellen und Oszilloskop mit TP10 verbinden. 4. R35 einstellen, daß Triggerpunkt bei 14,5 H ± 0,5 H vor V sync. liegt. *1. Trigger oscilloscope externally with the signal from TP13 of the 01 M/S board.* *2. Set oscilloscope for plus (+) slope.* *3. Set for Recording mode and connect oscilloscope to TP10.* *4. Adjust R35 to position the trigger point 14.5 H ± 0.5 H prior to V sync.*

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
6	Voreinst. Spurlage *Tracking preset*	Aufzeich-nung und Playback Grautreppe *Record and play back Stairstep signal*	TP102 (CTL PULSE) 0/4 A/S TP108 (FF-25) 0/4 A/S	R157 0/4 A/S	1. Anschluß eines Oszilloskops (Kanal 1) an TP108 und Kanal 2 an TP102. Oszilloskoptrigger auf CH-2 einstellen. 2. TRACKING-Kontrolle auf die zentrale Click-Position einstellen. 3. Treppensignal aufzeichnen und wiedergeben. 4. PB-CTL-Impuls und FF-25 Signale beobachten. R157 einstellen, daß pos. Spitze des PB CTL-Impulses bei 0,5 msek ± 0,5 msek vor der abfallenden Flanke des FF-25 Impulses liegt. (Abb. 4-3.6) *1. Connect channel 2 of a dual trace oscilloscope to TP108 and channel 2 to TP102. Set the oscilloscope trigger to CH-2.* *2. Set the TRACKING control to the center click position.* *3. Record and play back a stairstep signal.* *4. Observe the P.B. CTL pulse and FF-25 signals. Adjust R157 to position the positive peak of the P.B. CTL pulse 0.5 msec ± 0,5 msec ahead of the FF-25 pulse falling edge. (See Fig. 4-3-6.)*
7	Bildsuchlauf vorwärts Rauschbalken *FF search noise bar*	Aufzeich-nung und Playback *Record and play back*	Farbmonitor TV *Color monitor TV*	R156 0/4 A/S	1. Ein Signal Aufzeichnen und Wiedergeben. 2. Auf Bildsuchlauf vorwärts schalten und den Rauschbalken im Bild beobachten. 3. Einstellen von R156, daß der Rauschbalken so weit als möglich nach unten gelangt (mind. unterh. ¼ der Bildhöhe). 4. Vertikale Instabilität darf nicht vorkommen. *1. Record and play back a signal.* *2. Set for FF Search mode and observe the noise bar position in the monitor display.* *3. Adjust R156 to position the noise bar as far as possible toward the bottom (at least below 1/4th of the picture height).* *1. Confirm absence of vertical jitter.*
8	Bildsuchlauf rückwärts Rauschbalken *REW search noise bar*	Aufzeich-nung und Playback *Record and play back*	Farbmonitor TV *Color monitor TV*	R155 0/4 A/S	1. Ein Signal aufzeichnen und wiedergeben. 2. Auf Bildsuchlauf rückwärts schalten und den Rauschbalken im Bild beobachten. 3. R155 einstellen, daß der Rauschbalken so weit als möglich nach unten gelangt (mind. unterhalb ⅓ der Bildhöhe). 4. Vertikale Instabilität darf nicht vorkommen. *1. Record and play back a signal.* *2. Set for REW Search mode and observe the noise bar position in the monitor display.* *3. Adjust R155 to position the noise bar as far as possible toward the bottom (at least below 1/3rd of the picture height).* *4. Confirm absence of vertical jitter.*

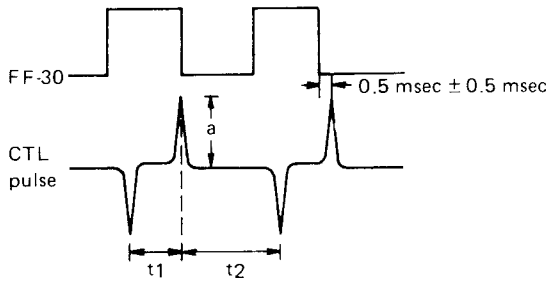


Abb./Fig. 4-3-6

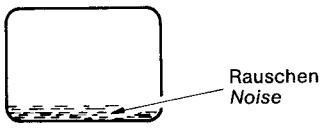


Abb./Fig. 4-3-7

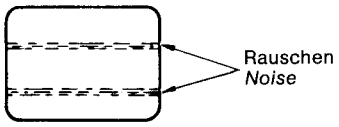


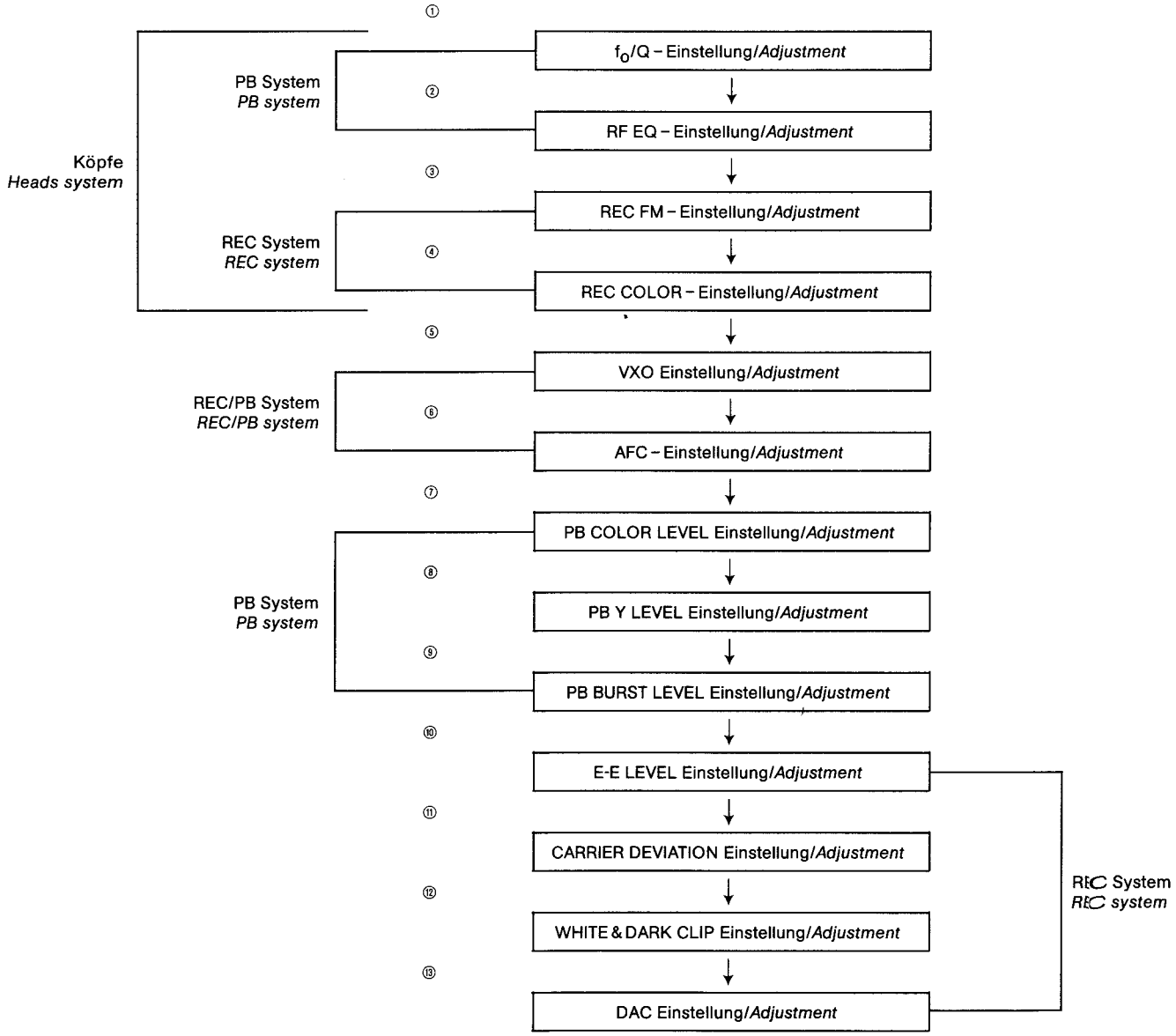
Abb./Fig. 4-3-8

4.4 Y/C und Vorverstärker-Schaltungen

1. Nach Austausch der Köpfe (Kopftrommel) bzw. des Vorverstärkers müssen die Schritte 1-4 durchgeführt werden. Bei Austausch der Trommeleinheit ist nur das Prüfverfahren aus Schritt 1 erforderlich (Einstellung nicht erforderlich).
2. Einstellen des E-E Levels vor Einstellung des Aufzeichnungssystems durchführen.
3. Während der Aufzeichnungssystem-Einstellung ist, außer bei anderen Angaben, TP 9 der [0][2] Y/C-Platte zu erden.
4. Einstellen des Playback-Systems vor Frequenz oder Hubeinstellung
5. Die generelle Abgleichfolge ist in Tabelle 4-4-1 angeführt. Führen Sie jedoch nur die erforderlichen Schritte durch.

4.4 Y/C and Pre-amplifier Circuits

1. Be sure to perform steps 1 through 4 after replacing the heads (upper drum) and/or pre-amplifier. If replacing the entire upper/lower drum assembly, only the checking procedure of step 1 is needed (adjustment not necessary.
2. Perform E-E level adjustment before proceeding to recording system adjustment.
3. During recording system adjustments, unless otherwise indicated, connect TP9 of the [0][2] Y/C board to ground.
4. Perform playback system adjustment prior to those for carrier and deviation.
5. Basic adjustment sequence is shown in Table 4-4-1. In practice, perform only those that become necessary.



Tabelle/Table 4-4-1 Generelle Abgleichfolge/*Basic adjustment sequence*

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
1	fo/Q	● Einstellung nur durchführen, wenn der richtige Frequenzgang nach Austausch der Köpfe bzw. des Vorverstärkers nicht erzielt wird, oder bei FM Pegelunterschieden ● *Perform this adjustment only when proper frequency response is not obtained after replacing the heads and/or pre-amplifier, or in event of difference between video channels.*			
		PLAY MH-C2 RF sweep	TP1 (PB FM) 0 2 Y/C	CH1: C1(fo), R1(Q) CH2: C2(fo), R2(Q) CH3: C3(fo), R3(Q) CH4: C4(fo), R4(Q) 0 3 PRE AMP	1. Einstellen von C1 auf fo mit 5 MHz. 2. Einstellen von R1, daß die 5 MHz Stufe das 1,1fache der 2-MHz-Stufe beträgt. 3. Gleiche Einstellung für die anderen Kanäle. Einstellung vorsichtig durchführen, daß zwischen den Kanälen ein gleicher Frequenzgang vorliegt. 4. R5 einstellen, daß zwischen CH-1 – CH-2 und CH-3 – CH-4 Differenzen ausgeschaltet werden. *1. Adjust C1 for fo of 5 MHz.* *2. Adjust R1 so that the 5 MHz level is 1.1 times the 2 MHz level.* *3. Similarly, perform these adjustments for the other head channels. Adjust carefully for uniform frequency response levels among the head channels.* *4. Adjust R5 to eliminate level difference between CH-1 – CH-2 and CH-3 – CH-4 pairs.*
				R5 (PB FM LEVEL) 0 3 PRE AMP	
2	RF EQ *RF EQ*	REC Gittermuster dann Playback *REC crosshatch then play back*	Monitor *Monitor*	R1 0 2 Y/C	1. Während der Aufnahme R1 so einstellen, daß bei Wiedergabe optimale Kantenschärfe und Schwarz-/Weiß-übergänge erzielt werden. Hinweis: Einstellung ggf. mehrfach wiederholen. *1. Adjust R1 during recording to obstain best point of apperture and black/white reversal during playback.* *Note: If necessary repeat several times.*
3	REC FM *REC FM level*	REC Modus Farbbalken *REC mode Color bar*	TP16 (REC FM) 0 2 Y/C	R43 0 2 Y/C	1. Während der Aufnahme Anschluß des Oszilloskops an TP16. R43 auf 3,4 V s-s einstellen. *1. Set for the recording mode and connect oscilloscope to TP16. Adjust R43 for level of 3,4 V p-p.*

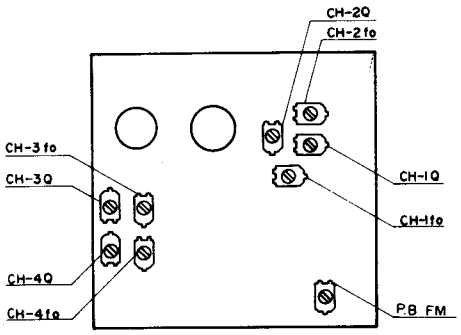


Abb./Fig. 4-4-1

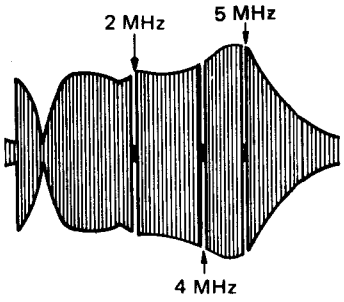


Abb./Fig. 4-4-2

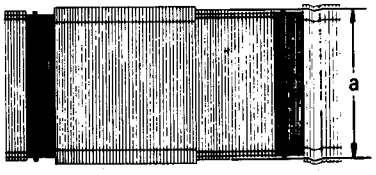


Abb./Fig. 4-4-4

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
4	Aufzeichnungs-Farb-Pegel *Recording color level*	Aufzeich-nung und Playback Farbbalken *Record and playback Color bar*	TP6 (PB COLOR) [0][2] Y/C	R39 [0][2] Y/C	1. Ein Farbbalkensignal aufzeichnen und wiedergeben 2. Oszilloskop an TP6 anschließen. 3. Während des Aufzeichnens R39 derart einstellen, daß während der Wiedergabe die höhere der CH1 und CH2-Stufen 0,2 ± 0,05 Vss beträgt. *1. Record and play back a color bar signal.* *2. Connect oscilloscope to TP6.* *3. During recording, adjust R39 so that during playback, the larger of the CH1 and CH2 levels becomes 0.2 ± 0.05 Vp-p.*
5	VCO 4.43 MHz *VCO 4.43 MHz*	Wiedergeben MH-C2 Farbbalken *Play MH-C2 Color bar*	TP5 (VCO) [0][2] Y/C	C22 [0][2] Y/C	1. Anschließen eines 33 kOhm-Widerstands zwischen TP4 und TP7 der Y/C-Platte. 2. Anschließen eines Frequenzzählers an TP5 und Einstellen von C22 auf 4,433618 MHz ± 50 Hz. *1. Connect a 33 k-ohm resistor between TP4 and TP7 of the Y/C board.* *2. Connect a frequency counter to TP5 and adjust C22 to obtain 4.433618 MHz ± 50 Hz.*
6	AFC *AFC*	Wiedergeben MH-C2 Farbbalken *Play MH-C2 Color bar*	TP12 (5,15 MHz) [0][2] Y/C	R41 [0][2] Y/C	1. 2,5 V DC an TP15 2. Frequenzzähler mit TP12 verbinden. 3. R41 auf 5,15 MHz ± 100 kHz einstellen. *1. Supply regulated DC 2.5 V to TP15.* *2. Connect a frequency counter to TP12.* *3. Adjust R41 to obtain 5.15 MHz ± 100 kHz.*
7	PB Farb-Pegel *PB color level*	Wiedergeben MH-C2 Farbbalken *Play MH-C2 Color bar*	TP6 (PB COLOR) [0][2] Y/C	R20 [0][2] Y/C	1. Oszilloskop mit TP6 verbinden und R20 derart einstellen, daß der größte der 4 Kanäle 0,2 ± 0,05 Vss erreicht. 2. Der Niveauunterschied zwischen den Kanälen muß innerhalb 4 dB liegen. *1. Connect oscilloscope to TP6 and adjust R20 so that the largest of the 4 channel waveform segments becomes 0.2 ± 0.05 Vp-p.* *2. Confirm that the level difference among the channels is within 4 dB.*
8	PB Y-Pegel *PB Y level*	MH-C2 Farbbalken *MH-C2 Color bar*	TP10 (VIDEO OUT) [0][1] M/S	R45 [0][2] Y/C	1. VIDEO OUT mit 75 Ohm abschließen und Anschluß des Oszilloskops an TP10. 2. R40 auf ein Y-Niveau von 0,96 ± 0,03 Vss einstellen. *1. Terminate VIDEO OUT at 75 ohms and connect oscilloscope to TP10.* *2. Adjust R40 for Y level of 0.96 ± 0.03 V p-p.*

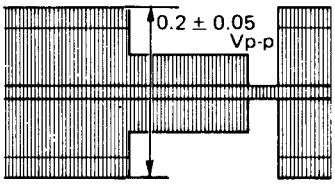


Abb./Fig. 4-4-5

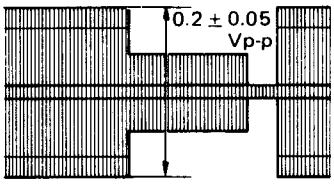


Abb./Fig. 4-4-6

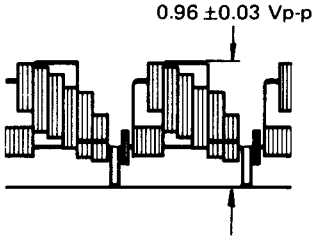
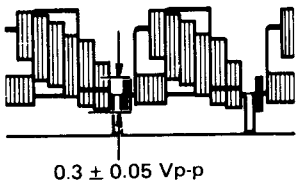
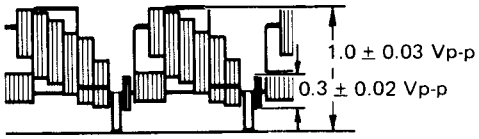
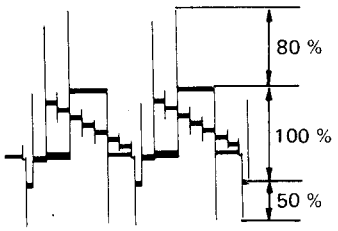
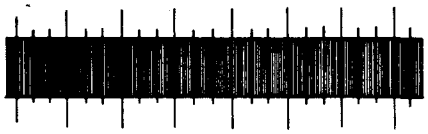


Abb./Fig. 4-4-7

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
9	PB Burst-Pegel *PB burst level*	MH-C2 Farbbalken *MH-C2 Color bar*	TP10 (VIDEO OUT) 01 M/S	R38 02 Y/C	1. VIDEO OUT mit 75 Ohm abschließen und Oszilloskop an TP10 anschließen 2. R38 auf Burst-Pegel von 0,3 ± 0,03 Vss einstellen. *1. Terminate VIDEO OUT at 75 ohms and connect oscilloscope to TP10.* *2. Adjust R38 for burst level of 0.3 ± 0.03 V p-p.*
					
	Abb./Fig. 4-4-8				
10	E-E-Stufe *E-E level*	E.E Modus Farbbalken *E.E mode Color bar*	TP10 (VIDEO OUT) 01 M/S	R22 R16 02 Y/C	1. VIDEO OUT mit 75 Ohm abschließen und Anschluß des Oszilloskops an TP10 2. R22 auf Y-Stufe von 1,0 ± 0,03 Vss einstellen 3. R16 auf Burst-Pegel von 0,3 ± 0,02 Vss einstellen. *1. Terminate VIDEO OUT at 75 ohms and connect oscilloscope to TP10.* *2. Adjust R22 for Y level of 1.0 ± 0.03 V p-p.* *3. Adjust R16 for burst level of 0.3 ± 0.02 V p-p.*
					
	Abb./Fig. 4-4-9				
11	Träger + Hub *Carrier deviation*	REC Modus *REC mode*	TP16 (REC FM) 02 Y/C TP10 (VIDEO OUT) 01 M/S	R5 (CARRIER) 02 Y/C R6 (Deviation) 02 Y/C	1. Frequenzzähler an TP16 anschließen und signalfrei aufzeichnen. 2. R5 auf 3,8 MHz ± 50 Hz einstellen. 3. Farbbalken Signal aufzeichnen und wiedergeben. Anschluß des Oszilloskops an TP10. 4. Während des Aufzeichnens R6 derart einstellen, daß die Y-Stufe während der Wiedergabe bei 0,96 ± 0,03 Vss liegt. *1. Connect a frequency counter to TP16 and record without a signal.* *2. Adjust R5 to obtain 3.8 MHz ± 50 kHz.* *3. Record and play back a color bar signal. Connect oscilloscope to TP10.* *4. During recording, adjust R6 so that during playback, the Y level becomes 0.96 ± 0.03 V p-p.*
12	Weiß & Scharz Clip *White & Dark clip*	E.E Modus Farbbalken *E.E mode Color bar*	TP2 (EMPHASIS) 02 Y/C	R4 (W. CLIP) R9 (D. CLIP) 02 Y/C	1. Oszilloskop an TP2 anschließen. 2. Im E-E-Modus R4 und R9 auf Schwarz-Weiß-Clip von 80 % bzw. 40 % einstellen. *1. Connect oscilloscope to TP2.* *2. In E-E mode, adjust R4 and R9 for white and dark clip of 80 % and 40 % respectively.*
					
	Abb./Fig. 4-4-10				
13	DAC *DAC*		Farbmonitor TV *Color monitor TV*	R27 (D YAC)	1. TP9 von der Masse trennen. 2. Eine Person aufzeichnen und wiedergeben. Während des Aufzeichnens R27 derart einstellen, daß während der Wiedergabe klare Konturen und möglichst natürliche Hautfarben entstehen. *1. Disconnect TP9 from ground.* *2. Record and play back a human subject. Adjust R27 during recording to obtain clear contours and most natural skintones during playback.*

Nr. No.	Pos. Item	Modus Mode	Prüfpunkte Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
14	Rauschen CANCEL *Noise CANCEL*	P.B Modus MH-C2 Grautreppe *P.B mode MH-C2 stairsteps*	TP10 (Noise CANCEL) [0][2] Y/C	R44 (NR)	1. Oszilloskop an TP10 anschließen. 2. R44 derart einstellen, daß die Wellenform gem. 4-4-11 abgeschwächt wird. *1. Connect oscilloscope to TP10.* *2. Adjust R44 to minimize the waveform as shown in Fig. 4-4-11.*

FALSCH
INCORRECT



RICHTIG
CORRECT

Abb./Fig. 4-4-11

4.5 AUDIO-Kreis/AUDIO CIRCUIT

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
1	PB Pegel *PB level*	Wiedergabe MH-C2 (1 kHz) *Play MH-C2 (1 kHz)*	TP2 (AUDIO OUT) [0][4] A/S	R30 [0][4] A/S	1. Audiotester an TP2 anschließen und 1kHz-Signal des MH-C2 Abgleichbandes spielen. 2. R30 auf − 6 ± 0,5 dB einstellen. *1. Connect an audio tester to TP2 and play 1 kHz signal of MH-C2 alignment tape.* *2. Adjust R30 to obtain − 6 ± 0.5 dBs.*
2	Audio-Bias-Pegel *Audio bias level*	REC Modus *REC mode*	TP3 (BIAS LEVEL-2) TP4 (BIAS LEVEL-1) [0][4] A/S	R2 [0][4] A/S	1. Ohne Audiosignal auf „Aufzeichnung" einstellen. 2. Den Eingang des Audiotesters an TP4 anschließen und Masse an TP3. 3. R2 einstellen, so daß ein Bias-Niveau von 2,3 ± 0,3 mV-rms erzielt wird. *1. Without an audio signal, set for Recording mode.* *2. Connect "hot" side of audio tester to TP4 and ground side to TP3.* *3. Adjust R2 to obtain a bias level of 2.3 ± 0.3 mV-rms.*
3	E-E-Pegel *E-E level*	E-E Modus 1 kHz *E-E mode 1 kHz*	TP2 (AUDIO OUT) TP5 (GND) [0][4] A/S	R14 [0][4] A/S	1. Den Eingang des Audiotesters mit TP2 verbinden und Masse an TP5 anschließen. 2. Schaltung gem. 4-5-1 ausführen. 3. R14 auf − 6 dB ± 0,5 dBs einstellen. *1. Connect "hot" side of audio tester to TP2 and ground side to TP5.* *2. Connect the circuit shown in Fig. 4-5-1.* *3. Adjust R14 to obtain − 6 ± 0.5 dBs.*
4	Aufzeichnungs-Pegel *Recording level*	Aufzeichnen u. Wiedergabe *Record and playback*	TP2 (AUDIO OUT) TP5 (GND) [0][4] A/S	R27 [0][4] A/S	1. Schaltung gem. Abb. 4-5-1 ausführen und ein 1 kHz − 20 dB-Signal eingeben. Signal aufzeichnen und wiedergeben. 2. Audiotester an TP2 anschließen und R27 während der Wiedergabe auf − 6 ± 1 dB einstellen. (Während des Aufzeichnens ist das Niveau bei TP1 zu überwachen). *1. Connect the circuit shown in Fig. 4-5-1 and supply a 1 kHz − 20 dBs input. Record an play the signal.* *2. Connect audio tester to TP2 and adjust R27 to obtain − 6 ± 1 dBs during playback. (During recording, monitor the level at TP1.)*

[0][4] A/S

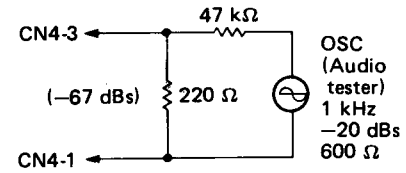


Abb./Fig. 4-5-1

4.6 Kamera-Teil – Vorbereitungen und Vorprüfungen

Anmerkungen:

a) Dieser Abschnitt gibt das Vorgehen nach Auswechseln der Aufnahmeröhre bzw. der Ablenkeinheit an. Daher können einige Schritte während der Routinearbeiten überflüssig sein.

b) Die Parameter können je nach den Eigenschaften der Aufnahmeröhren und Ablenkeinheit variieren. Die angeführten Werte sind daher als Referenzwerte heranzuziehen; die optimalen Werte sind individuell einzustellen.

c) Die Testpunkte und Einsteller befinden sich, wenn nicht anders angegeben, auf der Bauteileseite der Platine.

4.6.1 Prüfmuster-Ausleuchtung

Die richtige Ausleuchtung der Test-Charts ist für die ordnungsgemäße Einstellung von größter Wichtigkeit. Für eine gleichmäßige Ausleuchtung mit etwa 4000 Lux des Testmusters ist ein 3200 K-Licht (vorzugsweise 2 Befestigungen) anzuwenden.

4.6.2 Aufwärmen der Kamera

Vor der Durchführung der Einstellungen ist die Objektivkappe zu befestigen, die Kamera einzuschalten und eine Aufwärm- und Stabilisierungszeit von 10 Minuten (mind.) einzuplanen.

4.6.3 Prüfvorrichtungen

Für die Einstellungen sind ordnungsgemäß kalibrierte Vorrichtungen zu verwenden.

4.6.4 Testmuster

Die Muster und Charts sind sauber zu halten und dürfen keine Verfärbung oder andere Beschädigungen aufweisen.

4.6.5 Stromzuführung

2[3] EE & IND-Platte – flexible Leiterplatte
8,0 ± 0,1 V bei Terminal 10
7,9 ± 0,1 V bei Terminal 3
2[1] DEF & SSG-Platte:
8,0 ± 0,1 V bei CN-D2-(1)
4,9 ± 0,1 V bei Terminal 11 der flexiblen Leiterplatte

4.6.6 Hilfsträger und VCO

1. Hilfsträger- und VCO-Einstellungen nur im Bedarfsfall durchführen.
2. Einen Frequenzzähler an die Anschlüsse 16 und 17 der 2[1] Platine anschließen. C 22 der DEF & SSG-Platte auf 4,433619 MHz ± 20 Hz einstellen.
3. L4 der DEF & SSG-Platte auf 3,5 ± 0,1 V beim VCO „Testpunkt" einstellen.

4.6 Camera Part – Preparations and Preliminary Checks

Notes:

a) The procedures of this section include those following replacement of the pickup tube and/or deflection yoke. Consequently, some of the steps may be unnecessary for routine service.

b) Parameters vary slightly according to individual characteristics of pickup tubes and deflection yokes. Therefore, employ the listed values as general reference and adjust for optimum values.

c) Unless otherwise indicated, controls, test points, etc. are described as viewed from the parts mounted side of circuit boards.

4.6.1 Test Pattern Illumination

Proper illumination of the test charts is essential for performing correct adjustment.
Use 3200 K light (preferably 2 fixtures) to illuminate the test pattern evenly at approximately 4000 lux.

4.6.2 Camera Warmup

Before proceeding with adjustments, cap the camera lens, supply power and allow the camera to warm up and stabilize for at least ten minutes.

4.6.3 Test Instruments

Confirm that the proper calibrated test equipment is available for performing adjustments.

4.6.4 Test Patterns

Test patterns and charts must be clean and free from discoloration or other damage.

4.6.5 Power Supply Checks

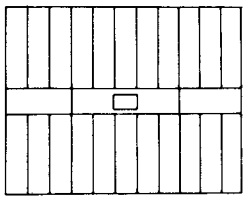
2[3] EE & IND board flexible pattern:
8.0 ± 0.1 V at terminal 10
7.9 ± 0.1 V at terminal 3
2[1] DEF & SSG board:
8.0 ± 0.1 V at CN-D2-(1)
4.9 ± 0.1 V at terminal 11 of flexible pattern

4.6.6 Subcarrier and VCO

1. Perform subcarrier and VCO adjustments only when considered necessary.
2. Connect a frequency counter to terminals 16 and 17 of 2[1] flexible pattern. Adjust C22 of the DEF & SSG board to obtain 4.433619 MHz ± 20 Hz.
3. Adjust L4 of the DEF & SSG board to obtain 3.5 ± 0.1 V at the VCO test "spot".

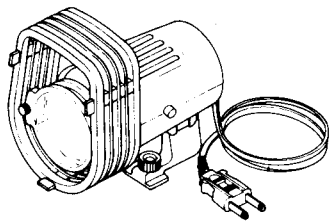
4.7 Werkzeuge und Vorrichtungen für die Farbkameraeinstellung

4.7.1 Spezialwerkzeug



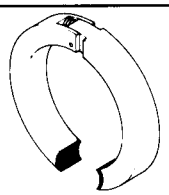
- Grauskala (GS-2A)
- Reflekt. Karton
- 11 Stufen, Gamma = 2,2
- Bildverhältnis 3 : 4

- *Grey scale pattern (SG-2A)*
- *Reflecting type, cardboard*
- *11 steps, gamma = 2.2*
- *Aspect ration 3 : 4*



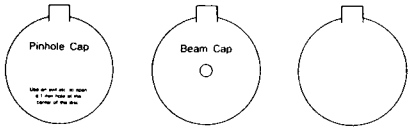
- Halogenlampe VL-P33 (oder gleichwertige Lampe)
- Farbtemperatur 3200 K
- Muster gleichmäßig mit mehr als 4000 Lux ausleuchten (vorzugsweise 2 Lampen)

- *Halogen lamp VL-P33 (or equivalent)*
- *Color temperature 3200 K*
- *Adjust (preferably 2 lamps) to illuminate pattern evenly at more than 4000 lux.*



- Röhrendrehvorrichtung

- *Tube rotation tool*



- Linsenkappen
- Für verschiedene Einstellungen

- *Lens caps*
- *Use for vertical center and beam adjustments*

4.7 Required Tools and Equipment for Color Camera Adjustment

4.7.1 Special Fixtures

4.7.2 Optische Vorrichtungen und Werkzeuge

1. Luxmesser
2. Farbtemperaturmesser
3. Luftgebläse (z. B. Blasebalg)
4. Linsenreinigungspapier und Alkohol
5. Hautfarbton-Muster
6. Farbtemperatur-Konversionsfilter
7. ND-Filter

4.7.3 Elektronische Testvorrichtungen

1. Oszilloskop (Zweikanal mit Verzögerung) mit 1 : 1 und 10 : 1 Tastköpfen
2. Kameraadapter (AA-P1) für Stromzufuhr während des Betriebs
3. Farbmonitor (richtig eingestellt) für Weißbalanceprüfungen
4. Frequenzzähler (Präzisionsausführung)
5. DC Voltmeter (Präzisionsausführung)
6. Vektorskop (für bestimmte Einstellungen notwendig)

4.7.4 Einstellungen und Anschlüsse

4.7.2 Optical Tools and Instruments

1. Lux meter
2. Color temperature meter
3. Air blower (e.g., squeeze bulb type such as used in photography)
4. Lens cleaning paper and alcohol
5. Skin tone test pattern
6. Color temperature conversion filters
7. ND (neutral density) filter

4.7.3 Electronic Test Instruments

1. Oscilloscope (dual trace with delay function) with 1:1 and 10:1 probes
2. Camera adapter (AA-P1) for supplying power during operation
3. Color monitor (correctly adjusted) for white balance checks
4. Frequency counter (precision type)
5. DC voltmeter (precision type)
6. Vectorscope (required for some adjustments)

4.7.4 Standard Setting and Connections

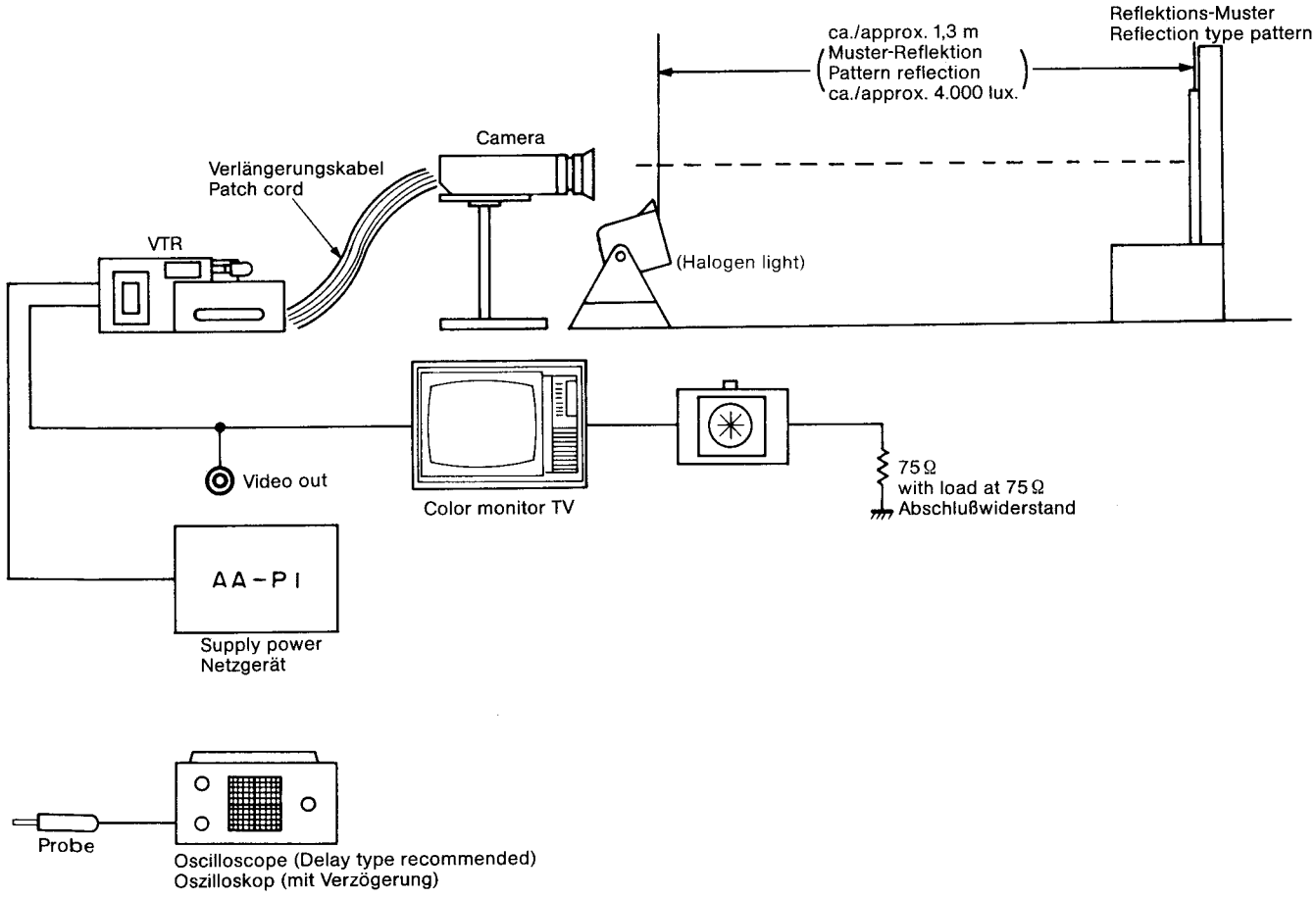
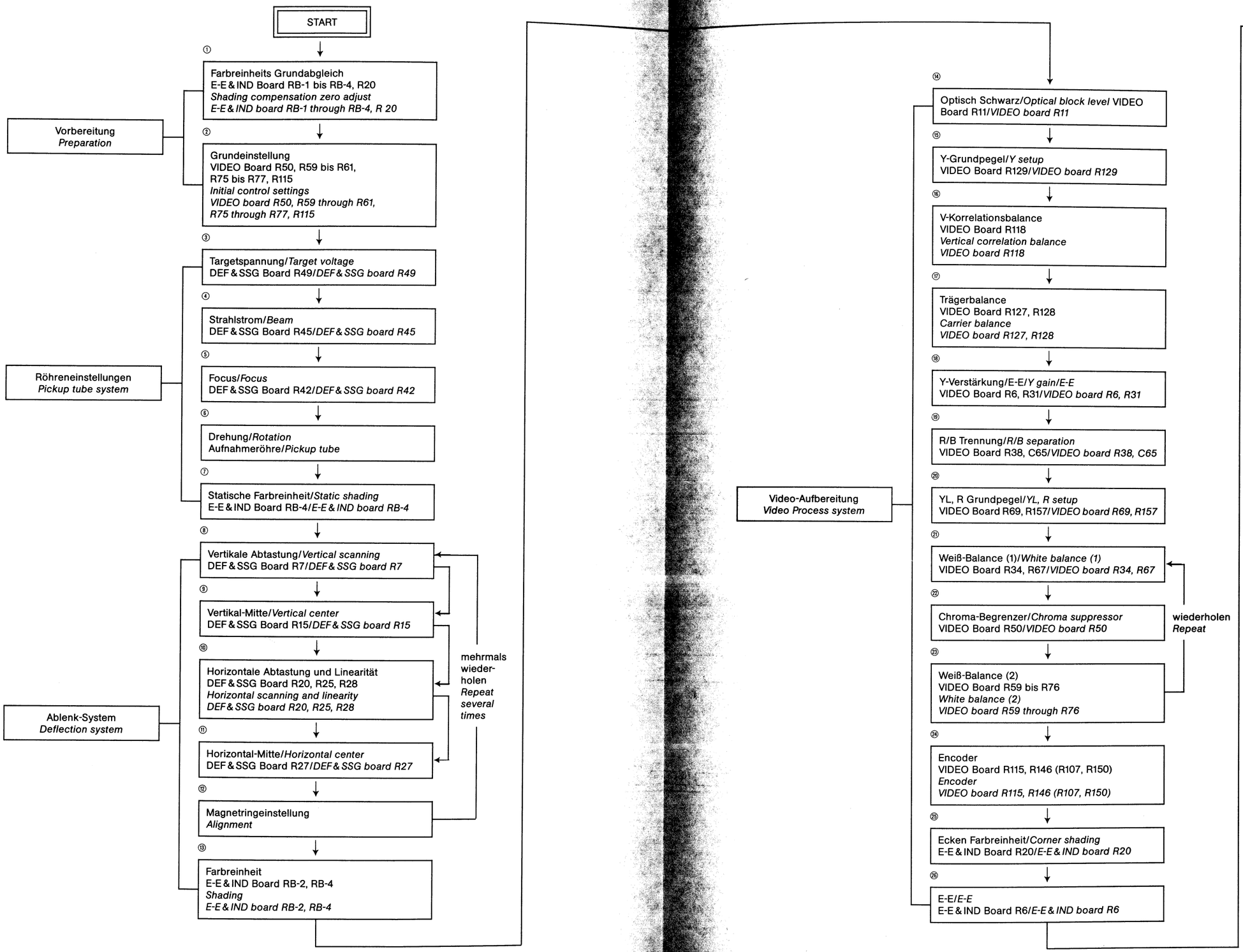
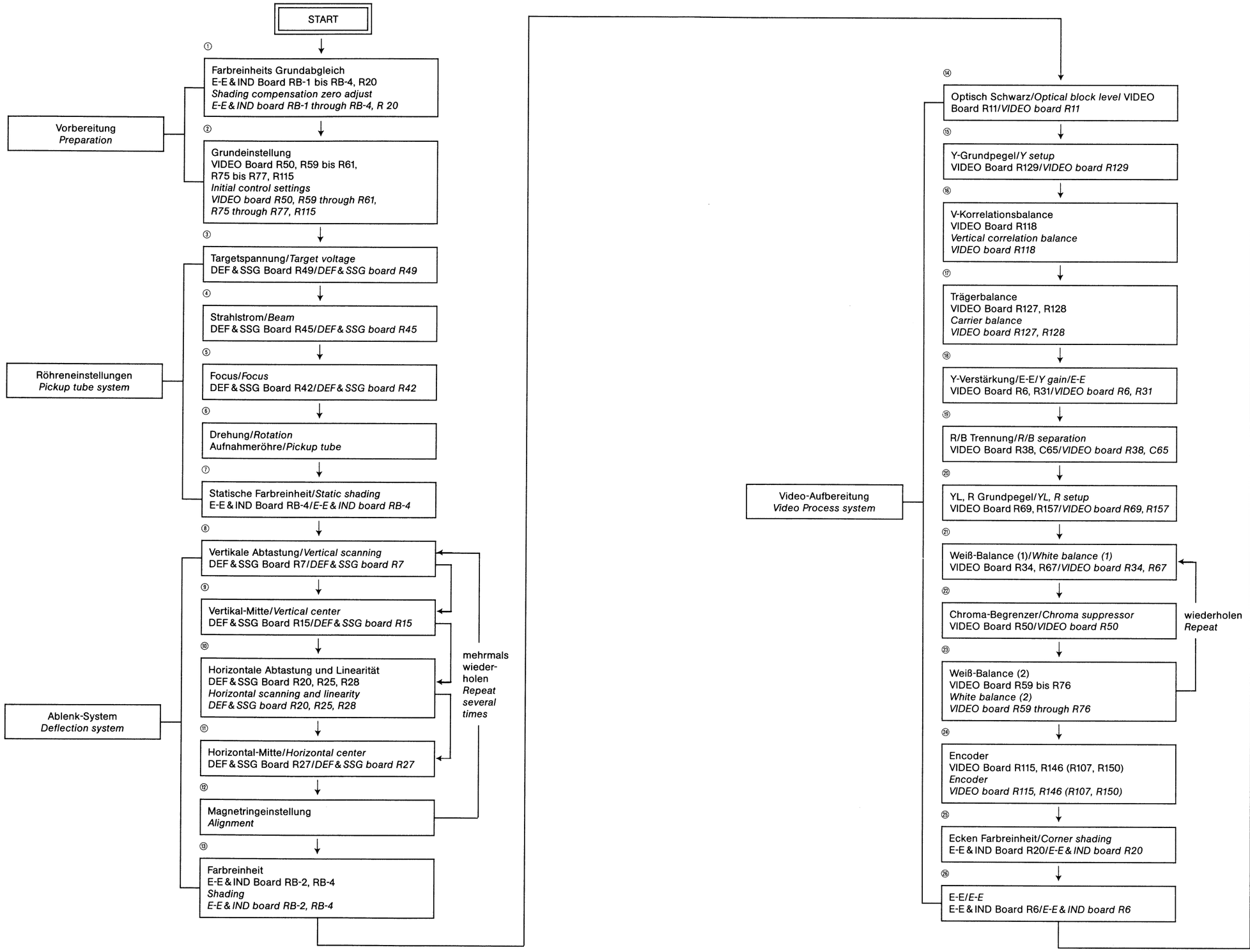


Abb./Fig. 4-7-1

4.8 Einstell-Ablauf – Adjustment sequence



4.8 Einstell-Ablauf – Adjustment sequence



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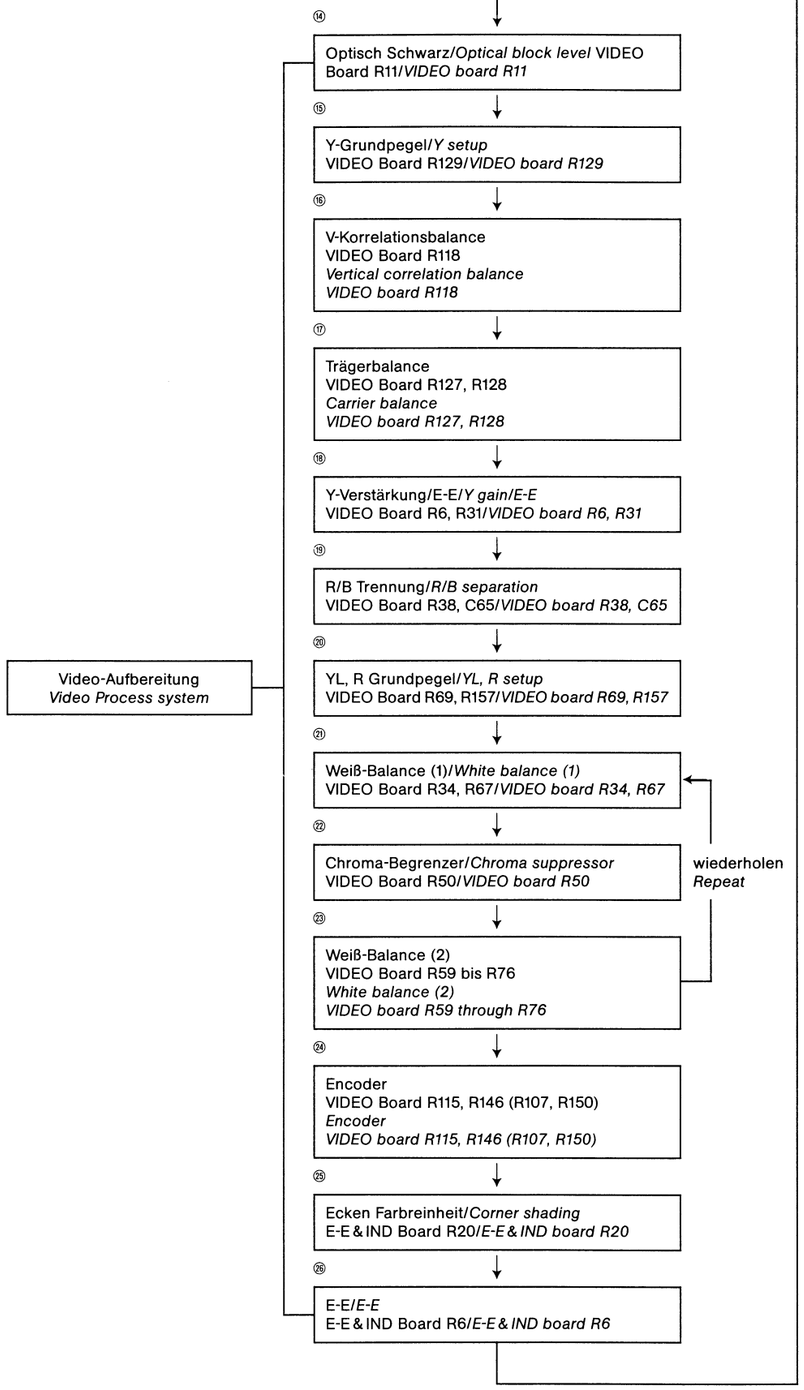
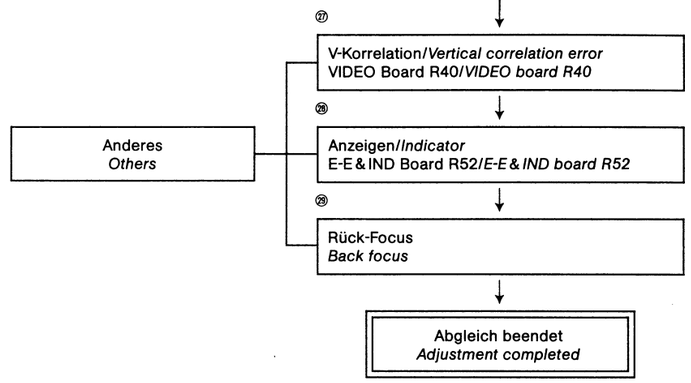

⑭
Optisch Schwarz/Optical block level VIDEO Board R11/VIDEO board R11
⑮
Y-Grundpegel/Y setup VIDEO Board R129/VIDEO board R129
⑯
V-Korrelationsbalance VIDEO Board R118 Vertical correlation balance VIDEO board R118
⑰
Trägerbalance VIDEO Board R127, R128 Carrier balance VIDEO board R127, R128
⑱
Y-Verstärkung/E-E/Y gain/E-E VIDEO Board R6, R31/VIDEO board R6, R31
⑲
R/B Trennung/R/B separation VIDEO Board R38, C65/VIDEO board R38, C65
⑳
YL, R Grundpegel/YL, R setup VIDEO Board R69, R157/VIDEO board R69, R157
㉑
Weiß-Balance (1)/White balance (1) VIDEO Board R34, R67/VIDEO board R34, R67
㉒
Chroma-Begrenzer/Chroma suppressor VIDEO Board R50/VIDEO board R50
wiederholen Repeat
㉓
Weiß-Balance (2) VIDEO Board R59 bis R76 White balance (2) VIDEO board R59 through R76
㉔
Encoder VIDEO Board R115, R146 (R107, R150) Encoder VIDEO board R115, R146 (R107, R150)
㉕
Ecken Farbreinheit/Corner shading E-E & IND Board R20/E-E & IND board R20
㉖
E-E/E-E E-E & IND Board R6/E-E & IND board R6
Video-Aufbereitung Video Process system


㉗
V-Korrelation/Vertical correlation error VIDEO Board R40/VIDEO board R40
㉘
Anderes Others
Anzeigen/Indicator E-E & IND Board R52/E-E & IND board R52
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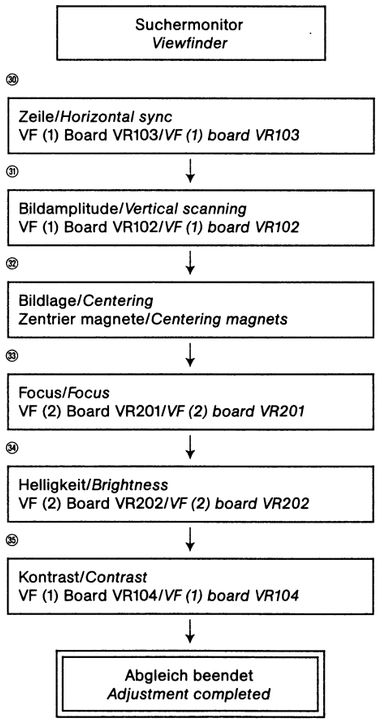
Rück-Focus Back focus
Abgleich beendet Adjustment completed


Suchermonitor Viewfinder
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Zeile/Horizontal sync VF (1) Board VR103/VF (1) board VR103
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Bildamplitude/Vertical scanning VF (1) Board VR102/VF (1) board VR102
㉜
Bildlage/Centering Zentrier magnete/Centering magnets
㉝
Focus/Focus VF (2) Board VR201/VF (2) board VR201
㉞
Helligkeit/Brightness VF (2) Board VR202/VF (2) board VR202
㉟
Kontrast/Contrast VF (1) Board VR104/VF (1) board VR104
Abgleich beendet Adjustment completed

4.9 Elektrische Einstellungen und Einstellpunkte

Anmerkung: Die Einstellungen 22 auf der Camera VIDEO-Platte R 107 (B-Y Verstärkung) und R 150 (SC PHASE) dürfen nicht verändert werden. Sie wurden im Herstellerwerk vorgenommen.

4.9 Electrical Adjustments and Locations

Note: Avoid disturbing the settings of 22 C VIDEO board R107 (B-Y GAIN) and R150 (SC PHASE). These have been pre-adjusted at the factory.

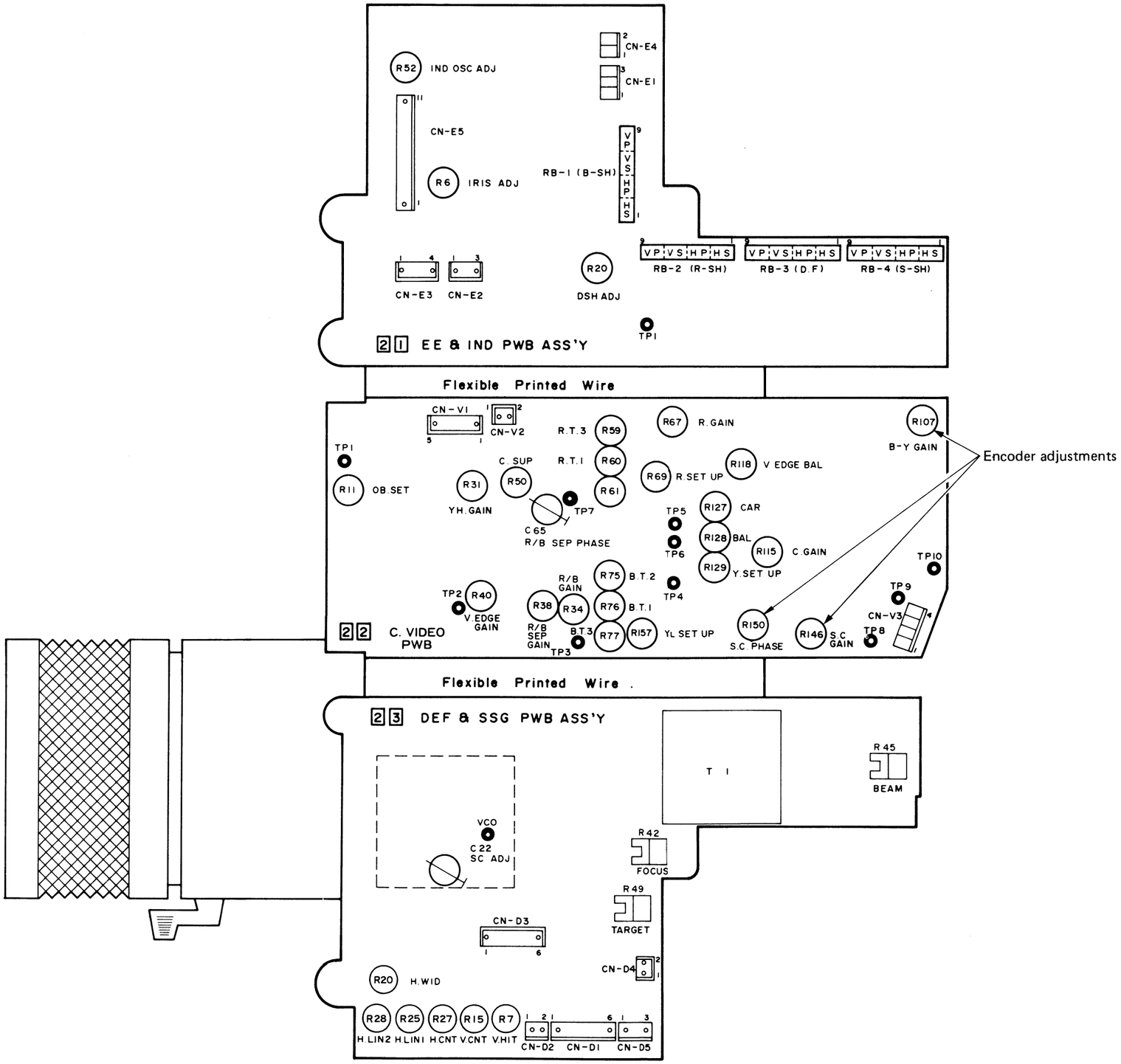
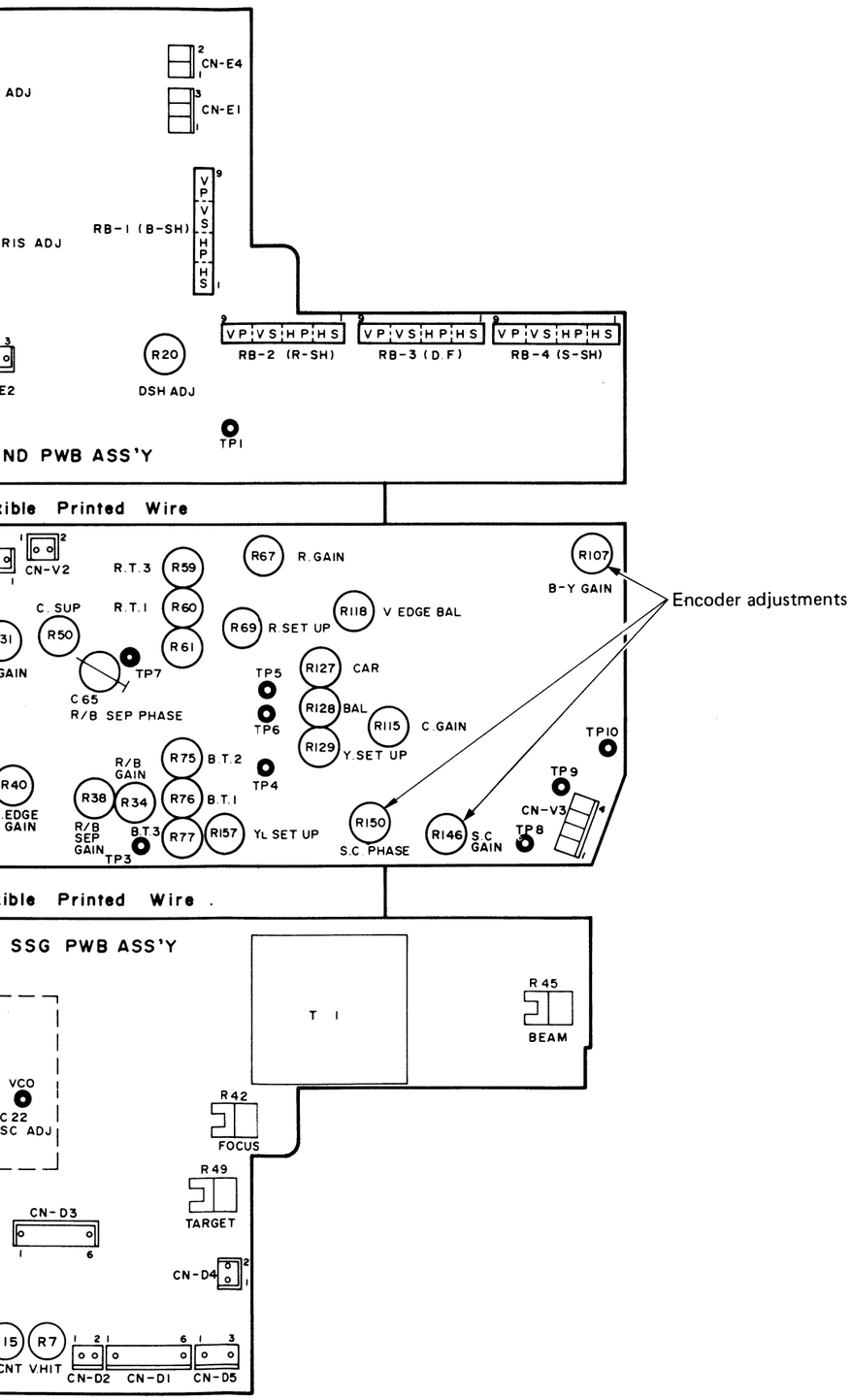


Abb./Fig. 4-9-1

al Adjustments and Locations

ürfen nicht verändert werden. Sie wurden

been pre-adjusted at the factory.



Encoder adjustments

Abb./Fig. 4-9-1

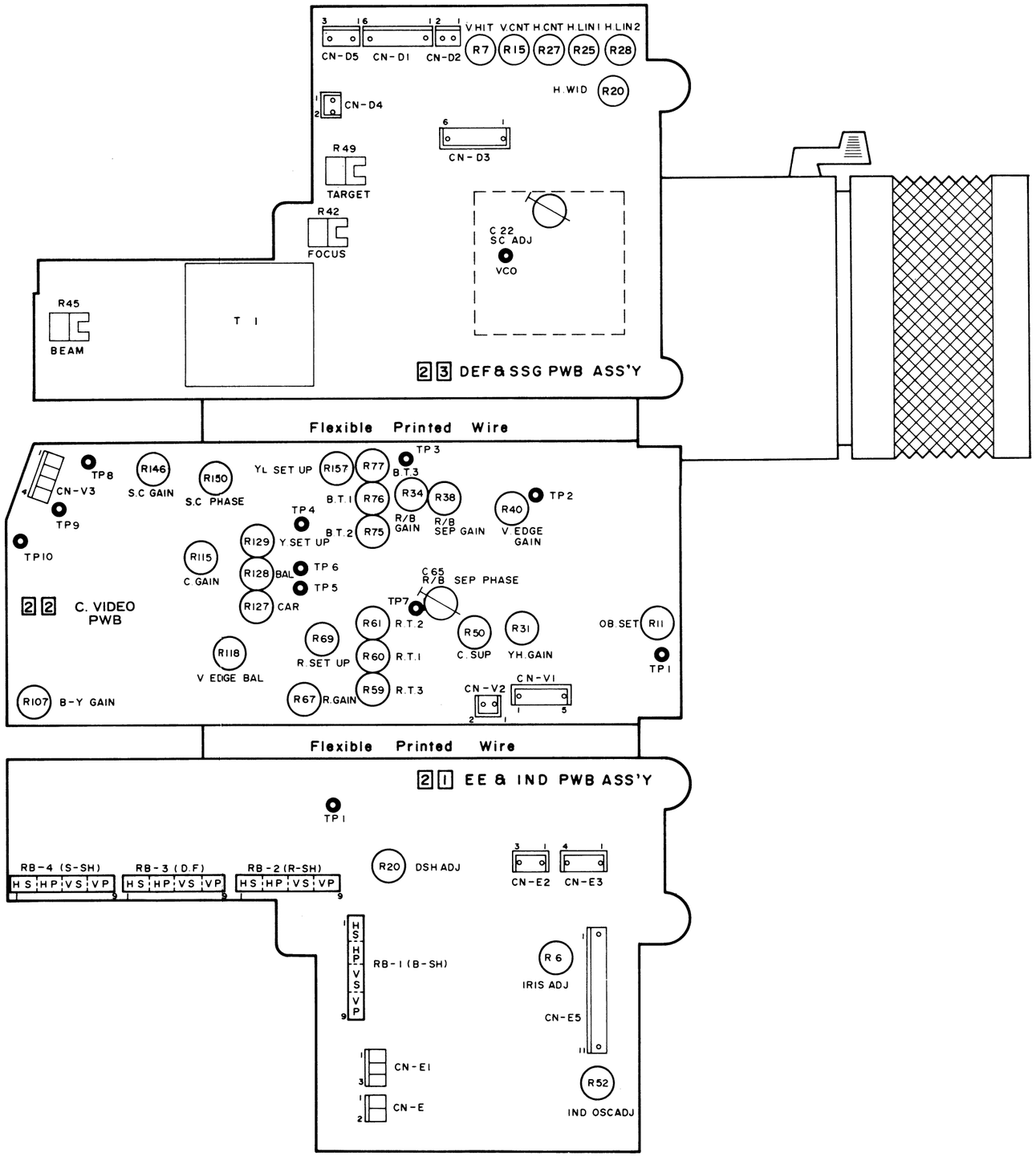
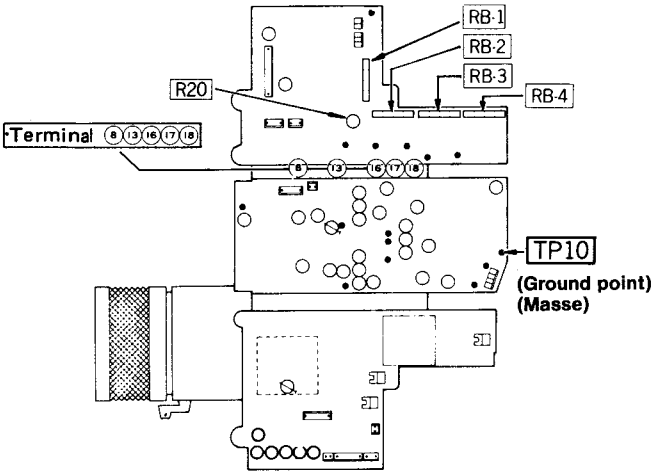


Abb./Fig. 4-9-2

4.9.1 Voreinstellungen – Preparatory Adjustments

Anm.: Als Massepunkt ist TP10 der ⊡⊡ CAMERA VIDEO-Platte zu verwenden.
Notes: For ground point, use ⊡⊡ CAMERA VIDEO board TP10.

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
1-1	Blau Farbreinheit Minimum	Iris geschlossen	E-E-Platte Flex. Platte Terminal ⑬	RB-1 (B SH)	Nach Austausch der Aufnahmeröhre ist die Farbreinheit neu einzustellen RB-1–4 und R20 müssen auf Minimum zu einer flachen Kurvenform eingestellt werden. *Be sure to adjust shading compensation waveform after replacing the pickup tube. Adjust RB-1 through RB-4 and R20 for flat H parabola, H sawtooth, V parabola and V sawtooth waveforms.*
1-2	Rot Farbreinheit Minimum	"	Terminal ⑯	RB-2 (R SH)	
1-3	Dynamischer Focus Minimum	"	Terminal ⑰	RB-3 (D-FOCUS)	
1-4	Statische Farbreinheit Min.	"	Terminal ⑱	RB-4 (S.SH)	
1-5	Ecken Farbreinheit Minimum	"	Terminal ⑧	R20 (DBL.SH)	
1-1	*Blue shading compensation zero*	*Iris closed E-E & IND board side Flexible board Terminal ⑬*		*RB-1 (B SH)*	
1-2	*Red shading compensation zero*	"	*Terminal ⑯*	*RB-2 (R SH)*	
1-3	*Dynamic Focus zero*	"	*Terminal ⑰*	*RB-3 (D.FOCUS)*	
1-4	*Static shading zero*	"	*Terminal ⑱*	*RB-4 (S.SH)*	
1-5	*Corner shading zero*	"	*Terminal ⑧*	*R20 (DBL.SH)*	



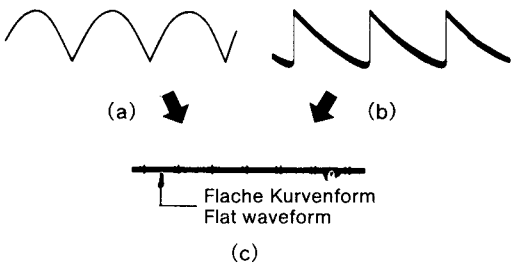
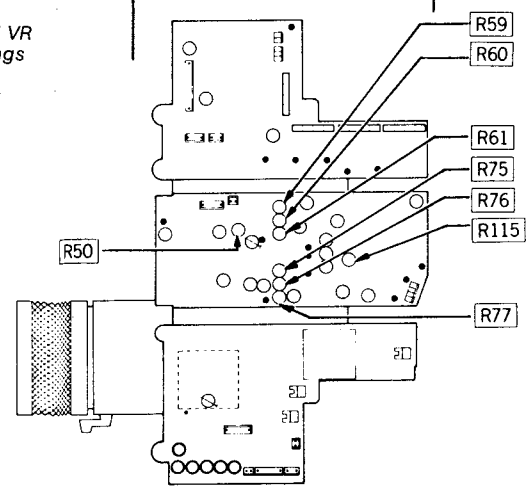


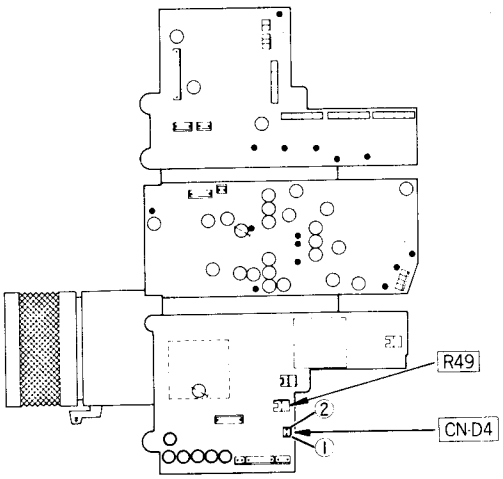
Abb./Fig. 4-9-3

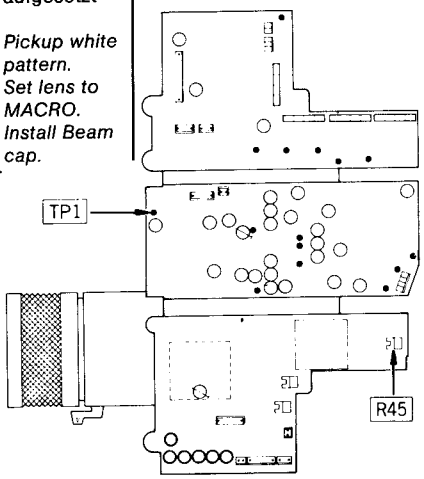
2	Einsteller-Grundposition *Initial VR settings*			R60(R.TRACK-1) R76(B.TRACK-1) R61(R.TRACK-2) R75(B.TRACK-2) R59(R.TRACK-3) R77(B.TRACK-3) R50(C.SUP) R115(C.GAIN)	1. TRACKING 1–3 auf VIDEO-Platte auf Mittelstellung einstellen. 2. R50 (C SUP) gegen den Uhrzeigersinn drehen. 3. R115 (C GAIN) im Uhrzeigersinn drehen. *1. On the VIDEO board, set TRACKING-1 through 3 to mechanical center.* *2. Turn R50 (C SUP) fully counterclockwise.* *3. Turn R115 (C GAIN) fully clockwise.*



4.9.2 Aufnahmeröhre – Pick-up Tube

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
3	Targetspannung *Target voltage*	Iris geschlossen *Iris closed*	CN-D4 pin ② [2][1] DEF & SSG board	R49 (TARGET BIAS)	Digitalvoltmeter an CN-D4 ② anschließen und R49 auf 55 +1/ −3 V DC einstellen. *Connect a digital voltmeter to CN-D4 (2) and adjust R49 for DC 55 +1/−3 V.*
4	Strahlstrom *Beam*	Weißvorlage aufnehmen Objektiv auf Makro „Beamcap" aufgesetzt *Pickup white pattern. Set lens to MACRO. Install Beam cap.*	TP1(PRE OUT) [2][2] VIDEO board	R45(BEAM) [2][1] DEF & SSG board	1. Diesen Abgleichpunkt bitte schnell erledigen, da für die Röhre Einbrenngefahr besteht. 2. Die Magnetringe wie bei Abb. 4.9.4 angegeben einstellen. 3. Iris auf Gegenlicht-Position und R45 auf den Wert vor der Sättigung einstellen. 1. *Perform this adjustment quickly in order to avoid burn damage to the pickup tube.* 2. *Set alignment magnets as indicated in the figure.* 3. *Vary the iris setting. Adjust R45 for a level of 0.55 Vp-p at the point just prior to beam saturation.*
5	Focus *Focus*	Weißvorlage *Pickup white pattern.*	TP3(BPF OUT) [2][2] VIDEO board	R42(FOCUS) [2][1] DEF & SSG board	R42 so einstellen, daß die auf V aufgelöste Hüllkurve flach bei maximaler Amplitude wird. *Adjust R42 so that carrier component of the V rate waveform is both maximum and flat.*





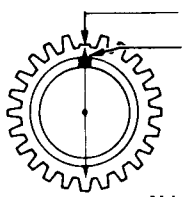
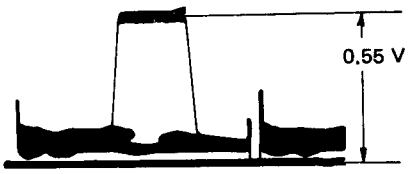
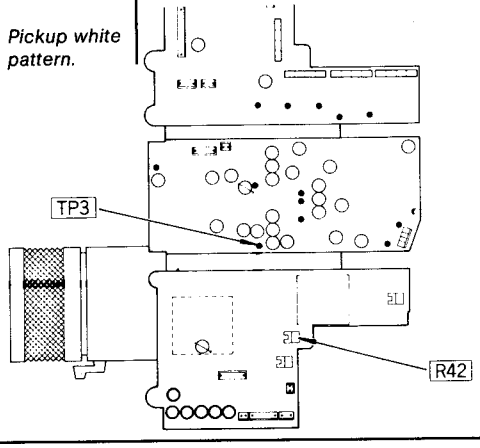
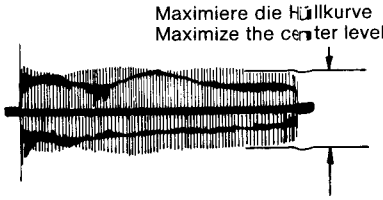


Abb./Fig. 4-9-4



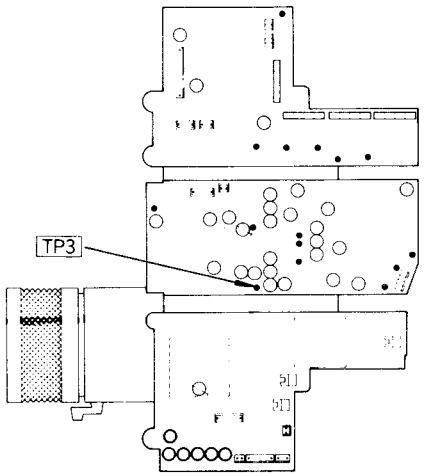
TP1 V-rate **Abb./Fig. 4-9-5**





TP3 V-rate **Abb./Fig. 4-9-6**

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
6	Drehung Aufnahmeröhre *Rotation*	Weißvorlage *Pickup white pattern.*	TP3(BPF OUT) [2][2] VIDEO board	SATICON	**Anm.:** Aufnahmeröhre nicht an der Fassung drehen, da dies sowohl die Röhre als auch die Fassung beschädigen kann. 1. Befestigungsschraube am Sicherungsriemen lösen. 2. Mit Oszilloskop die Mitte des Signals dehnen (Delay-Sweep) 3. Mit Drehwerkzeug den Glasteil der Röhre fassen. Röhre einstellen. Abb. (b) gibt den optimalen Punkt an. 4. Befestigungsschraube festziehen. **Note:** *Avoid turning the pickup tube by the socket, as this may damage both the tube and socket.* *1. Loosen the fixing screw of the belt that secures the pickup tube.* *2. Use the oscilloscope controls to expand the central portion of the waveform (delay sweep).* *3. Use the pickup tube rotation tool to grasp the glass portion of the tube. Turn the tube for zero beat and flattest waveform.* *Fig. (b) illustrates the optimum point.* *4. Tighten the belt securing screw.*
7	Statische Farbreinheit *Static shading (coarse)*	Iris geschlossen *Iris closed*	TP2 (Y_H) [2][2] VIDEO board	RB-4 (S.SH) [2][3] EE & IND board	RB-4 (S.SH) auf flachste Wellenform einstellen, an TP2 für H und V. *Adjust RB-4 (S.SH) for flattest waveform at TP2 in both H and V rates.*



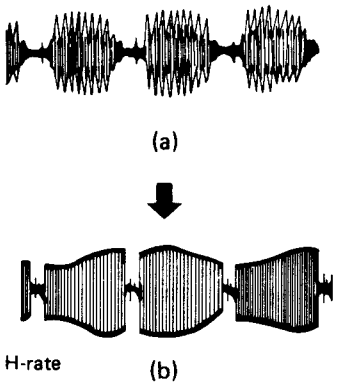
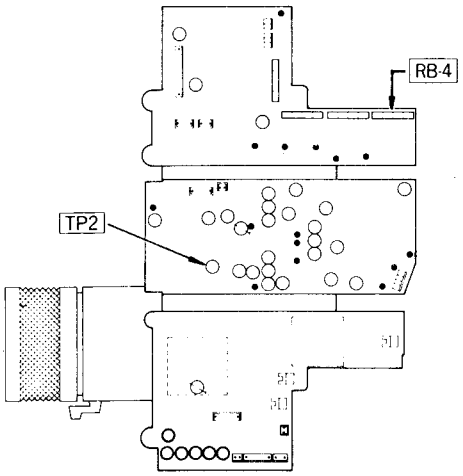


Abb./Fig. 4-9-7



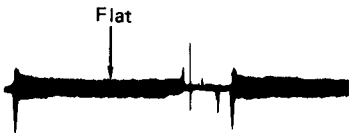
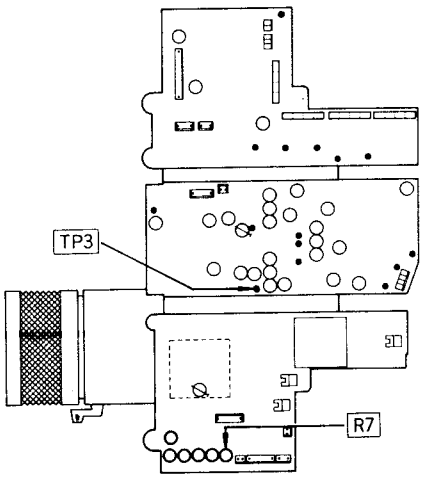


Abb./Fig. 4-9-8

4.9.3 Ablenk-System – Deflection System

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
8	Vertikale Abtastung *Vertical scanning*	Weißvorlage *Pickup white pattern.*	TP3(BPF OUT) [2][2] VIDEO Platine *TP3(BPF OUT) [2][2] VIDEO board*	R7(V.HIGHT) [2][1] DEF & SSG Platine *R7(V.HIGHT) [2][1] DEF & SSG board*	1. Vertikale und horizontale Abtastung und Zentrierung mehrmals wiederholen. 2. R7 so einstellen, daß eine glatte, ruhige Hüllkurve entsteht. *1. Repeat the vertical and horizontal scanning, and centering adjustments several times for optimum settings.* *2. Adjust R7 to minimize waveform undulations.*
9	Vertikal-Mitte *Vertical center*	Weißvorlage Makro mit „Pinhole cap" *Pickup white pattern. Set lens to Install pinhole cap.*	Farbmonitor TV *Color monitor TV*	R15(V.CENT) [2][1] DEF & SSG Platine *R15(V.CENT) [2][1] DEF & SSG board*	R15 derart einstellen, daß produzierter Punkt auf der Display-Anzeige vertikal zentriert ist. *Adjust R15 so that spot produced by the pinhole cap is centered vertically on the monitor TV display.*



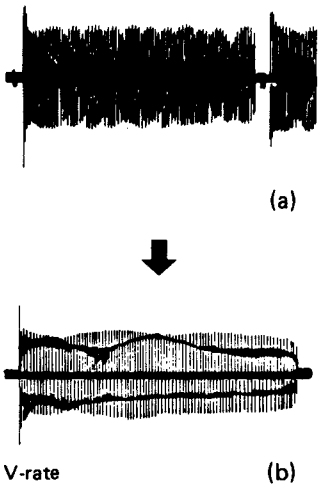
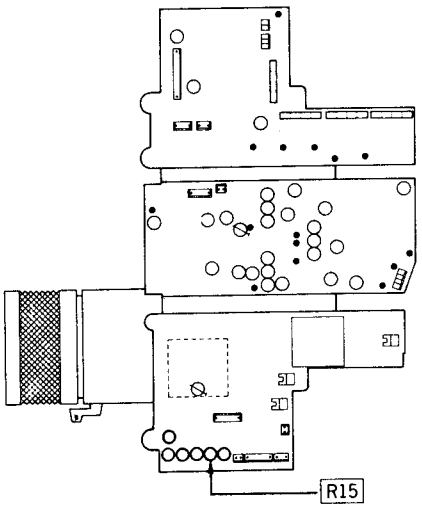


Abb./Fig. 4-9-9



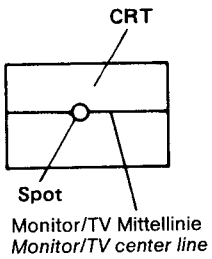
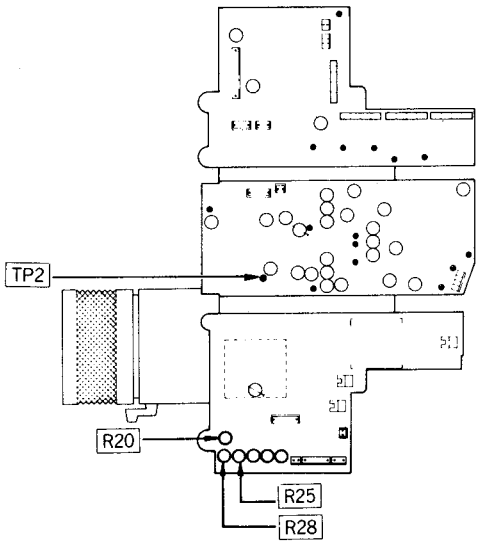
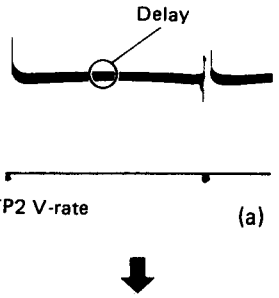
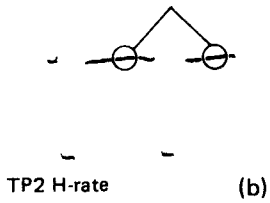
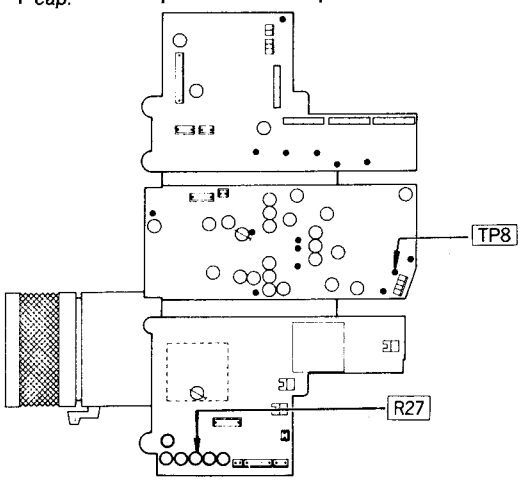


Abb./Fig. 4-9-10

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
10	Horizontale Abtastung und Linearität *Horizontal centering linearity*	Weißvorlage *Pickup white pattern.*	TP2 (Yh) 2 2 VIDEO Platine *TP2(Yh)* 2 2 *VIDEO board*	R20(H.WIDTH) R25(H.LIN-1) R28(H.LIN-2) 2 1 DEF & SSG Platine *R20(H.WIDTH)* *R25(H.LIN-1)* *R28(H.LIN-2)* 2 1 *DEF & SSG board*	1. Mit Oszilloskop TP2 Wellenform beobachten (V-Werte). Mit Delay den mittleren Bereich dehnen. 2. R20 gegen Uhrzeigersinn einstellen. 3. R25 und R28 auf minimale Träger-Amplitude einstellen. 4. R20 in der Einstellung belassen. 1. *Use oscilloscope to observe TP2 waveform at V rate. Employ delayed sweep at center area of one field.* 2. *Set R20 fully counterclockwise.* 3. *Mutually adjust R25 and R28 to obtain minimum carrier amplitude.* 4. *Leave R20 at the fully counterclockwise setting.*
					
					 R25 und R28 auf minimale Träger-Amplitude einstellen. *Mutually adjust R25 and R28 to obtain minimum carrier amplitude.*  **Abb./Fig. 4-9-11**
11	Horizontale Mitte *Horizontal centering*	Weißvorlage Makro mit „Pinhole cap" *Pickup white pattern. Set lens to MACRO. Install pinhole cap.*	TP8(Y OUT) 2 2 VIDEO Platine *TP8(Y OUT)* 2 2 *VIDEO board*	R27(H.CENT) 2 1 DEF & SSG Platine *R27(H.CENT)* 2 1 *DEF & SSG board*	R27 derart einstellen, daß Signal in die Mitte des horizontalen Synchronimpulses gelangt. *Adjust R27 to position the pinhole signal at center of horizontal sync.*
					
					 Abb./Fig. 4-9-12

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
12	Magnetring-einstellung *Alignment*	Weißvorlage *Pickup white pattern.*	TP5(R-YL) TP6(B-YL) [2][2] VIDEO Platine *TP5(R-YL)* *TP6(B-YL)* [2][2] *VIDEO board*	Magnetringe R42(FOCUS) [2][1] DEF & SSG Platine RB-3 (D.FOCUS) [2][3] EE & IND Platine *Alignment magnets* *R42(FOCUS)* [2][1] *DEF & SSG board* *RB-3 (D.FOCUS)* [2][3] *EE & IND board*	Zuvor folgendes überprüfen: a. Abgleichringe auf Nullposition (Nr 4) b. RB1–RB3 auf minimale Farbreinheitskompensation einstellen. c. Farbsättigung des TV-Monitors auf MAX. und KONTRAST auf Min. 1. Wenn die Farbdifferenzsignale von der Nullinie abweichen, mit R34 (R/B GAIN) B–Y TP6 auf Nullinie und mit R67 R–Y TP5 auf Nullinie einstellen. 2. Oszilloskop an TP5 und TP6 R42 (Focus) auf maximalen Pegel einstellen. 3. Der Grund dieses Abgleichs ist die exakte Landung des Elektronenstrahls in der Mitte der Targetfläche zu ermöglichen. Wenn also der Strahl focussiert oder defocussiert wird (mit R42), wird der abgebildete Fleck auf dem Bildschirm größer und kleiner. Wenn mit obigem Abgleich der Fleck nicht in Mittellage zu bringen ist, kann mit den Magnetringen die Mittellage hergestellt werden. Bitte den Abgleich sorgfältig mehrfach durchführen. 4. Bei optimaler Einstellung der Magnetringe RB3 (D.FOCUS) und R42 (FOCUS) so einstellen, daß die Farbdifferenzsignale an TP5 und TP6 höchste Amplitude erreichen und flach erscheinen (Bei H + V-Abbildung). 5. Nach dem Abgleich die Magnetringe mit Silikon fixieren. 6. Anschließend V-Abtastung und Linearität und H-Abtastung-Linearität-Lage überprüfen. *Check before proceeding:* *a. Alignment magnets set to zero.* *b. RB-1 to RB-3 are set for zero shading compensation.* *c. Set COLOR control of monitor-TV to maximum and CONTRAST to minimum.* *1. If the color difference signals deviate from the zero line, use R34 (R/B GAIN) to set B-Y to the zero line at TP6, and R67 to set R-Y to the zero-line.* *2. Connect a dual trace osciloscope to TP5 and TP6. Adjust R42 (FOCUS) of the DEF & SSG board to obtain maximum level.* *3. The Purpose of these adjustment steps is to obtain precisely perpendicular landing of the electron beam with respect to the center of the target face of the tube. At such time, when the beam is focused and defocused (by turning R42), the displayed point to a disc that expands and contracts evenly at the center of the screen.* *With the above (step 2) setting taken as center, turn R42 left and right, while observing the display on the monitor screen. Adjust the alignment ring positions so that the displayed image varies as described above. Perform this adjustment repeatedly and carefully, since it affects the adjustments that follow.* *4. At the optimum alignment point, adjust RB-3 (D FOCUS) and DEF & SSG board R42 so that the color difference signals at TP5 and TP6 are both maximum and flat at H and V rates.* *5. After completing adjustment, secure the alignment rings by applying a small amount of modeler's cement.* *6. Again confirm and if necessary readjust V scan, V center, H scan, H linearity and H center.*
13	Farbreinheit *Shading*	Weißvorlage *Pickup white pattern.*	TP5(R-YL) TP6(B-YL) [2][2] VIDEO Platine *TP5(R-YL)* *TP6(B-YL)* [2][3] *VIDEO board*	RB-1(B.SH) RB-2(R.SH) [2][3] EE & IND Platine *RB-1(B.SH)* *RB-2(R.SH)* [2][3] *EE & IND board*	1. Iris auf 0,4 V VIDEOAMPLITUDE TP8 einstellen (Y OUT). 2. Ein Oszilloskop an TP5 und TP6 anschließen. RB-1 und RB2 auf flachste Form bei H- und V-Werten einstellen. 3. Iris auf Mittel-Einrast-Position bringen. *1. Set the iris for 0.4 V video amplitude at TP8 (Y OUT).* *2. Connect a dual trace oscilloscope to TP5 and TP6. Adjust RB-1 and RB-2 to obtain the flattest waveforms at both H and V rates.* *3. Return the iris to the center clock position.*

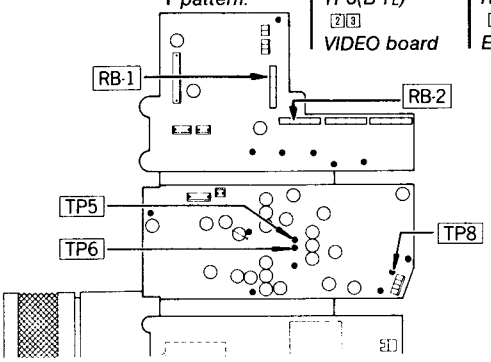


Abb./Fig. 4-9-14

Fleck mittig im Monitor-Bildschirm

Disc pattern centered with respect to edges in monitor-TV displays

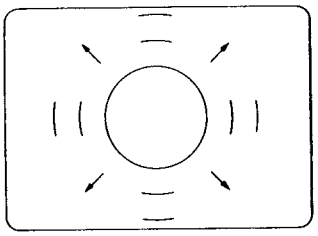


Abb./Fig. 4-9-13 (a)

Fleck nicht mittig im Monitor-Bildschirm

Disc pattern not centerized in monitor-TV display

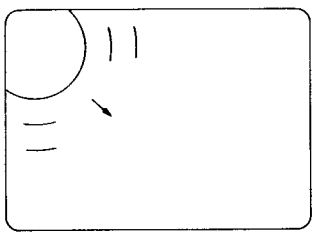
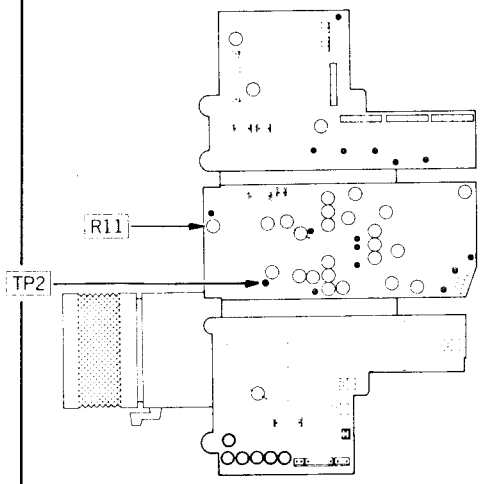


Abb./Fig. 4-9-13 (b)

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
14	Optisch schwarz *OB level*	Iris geschlossen *Iris closed*	TP2 (Y_H) 2 2 VIDEO Platine *TP2 (Y_H)* 2 2 *VIDEO board*	R11 (OB SET) 2 2 VIDEO Platine *R11 (OB SET)* 2 2 *VIDEO board*	1. Oszilloskop-Tastkopf über 10 kOhm Widerstand mit TP2 (YH) verbinden. 2. Empfindlichkeitsschalter zwischen „STD" und „UP" hin und herschalten, dabei Pegeldifferenzen an TP2 mit R11 (OB SET) beseitigen. *1. Through a 10 k-ohm resistor, connect oscilloscope probe to TP2 (YH).* *2. Operate the sensitivity switch between high and low positions. Adjust R11 (OB SET) to eliminate level difference at TP2.*
15	Y-Grundpegel *Y setup*	Iris geschlossen *Iris closed*	VIDEO OUT *VIDEO OUT*	R129 (Y. SET UP) 2 2 VIDEO Platine *R129 (Y.SET UP)* 2 2 *VIDEO board*	1. Empfindlichkeit auf „UP" und statisch Farbreinheit (Punkt 7) wiederholen. 2. Das Video E-E Ausgangssignal mit R129 auf 40 mV bringen. *1. Set to high sensitivity and repeat the static shading adjustment of step 7.* *2. Observe the E-E OUT signal of the VTR. Adjust R129 to obtain a setup level of 40 mV between pedestal and waveform center.*
16	Korrelations-balance *V correlation balance*		TP7 (V.EDGE) 2 2 VIDEO Platine *TP7 (V.EDGE)* 2 2 *VIDEO board*	R118 (V.EDGE.BAL) 2 2 VIDEO Platine *R118 (V.EDGE.BAL)* 2 2 *VIDEO board*	1. Grauskala aufnehmen, die das Bild vollständig ausfüllt. 2. R118 auf minimum Signal einstellen. *1. Pick up greyscale which completely fills the picture area.* *2. Adjust R118 for average signal value of zero.*



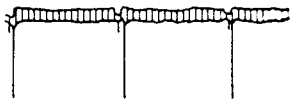
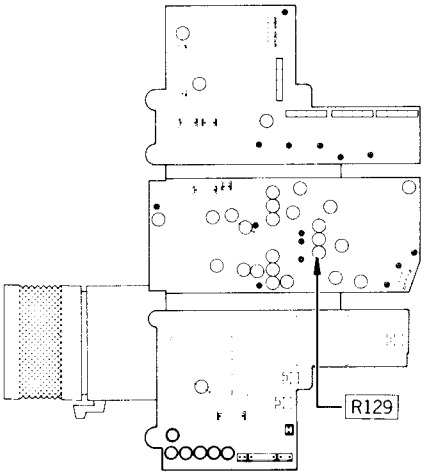


Abb./Fig. 4-9-15



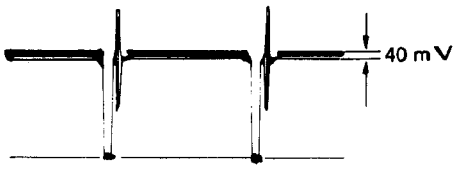


Abb./Fig. 4-9-16

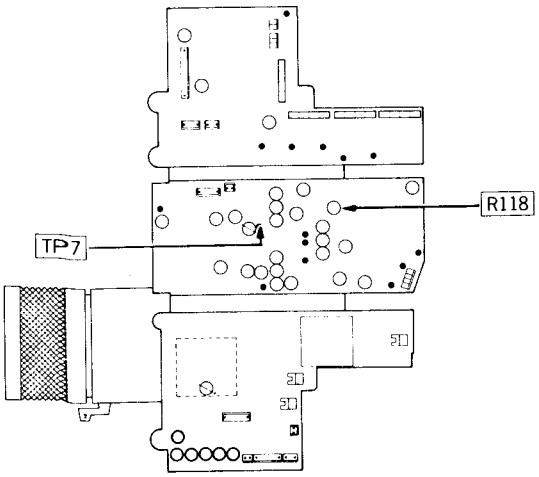
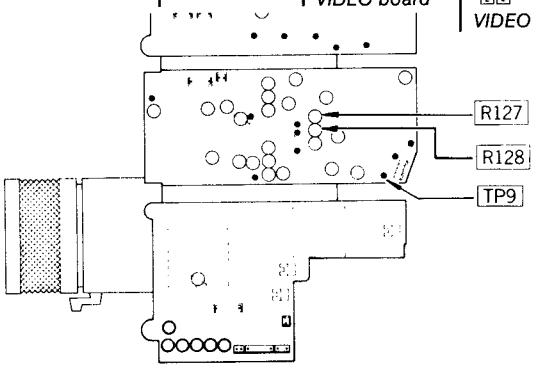


Abb./Fig. 4-9-17

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
17	Trägerbalance *Carrier balance*	Iris geschlossen *Iris closed*	TP9(C.OUT) [2][2] VIDEO Platine *TP9 (C.OUT)* [2][2] *VIDEO board*	R127 (B.CAR BAL) R128 (R.CAR BAL) [2][2] VIDEO Platine *R127 (B.CAR BAL)* *R128 (R.CAR BAL)* [2][2] *VIDEO board*	R127 und R128 wechselseitig auf Mindest-Amplitude (Träger) bei TP9 (C.OUT) einstellen. *Mutually adjust R127 and R128 for minimum carrier amplitude at TP9 (C.OUT).*
18	Y-Verst. E-E grob *Y gain* *E-E coarse*		TP1(PRE OUT) [2][2] VIDEO Platine *TP1 (PRE OUT)* [2][2] *VIDEO board*	R6 (IRIS ADJ) [2][1] EE & IND Platine R31 (Y_H GAIN) [2][2] VIDEO Platine *R6 (IRIS ADJ)* [2][1] *EE & IND board* *R31 (Y_H GAIN)* [2][2] VIDEO board	1. Grauskala aufnehmen, die den Bildbereich vollständig ausfüllt. 2. Iris-Kontrolle auf mech. Zentrum einstellen. Oszilloskop-Tastkopf mit einem 10-kOhm-Widerstand an TP1 anschließen und R6 auf Weißwertspitze von 0,17 V einstellen. *1. Pick up greyscale which completely fills the picture area.* *2. Set iris control of control panel to mechanical center position. Through a 10 k-ohm resistor, connect oscilloscope probe to TP1 adjust R6 for white peak of 0.17 V.*
19	R/B Trennung *R/B separation*	Weißvorlage *Pickup white pattern.*	TP6(B-Y) [2][2] VIDEO Platine *TP6(B-Y)* [2][2] *VIDEO board*	R38 (R/B SEP GAIN) C65 (R/B SEP PHASE) [2][2] VIDEO Platine *R38 (R/B SEP GAIN)* *C65 (R/B SEP PHASE)* [2][2] *VIDEO board*	1. Iris bei TP8 (Y OUT) auf Video-Ampl. von 0,4 V einstellen. 2. Oszilloskop an TP6 anschließen. R38 und C65 wechselseitig einstellen, so daß Trägerschwankungen des B-Y-Signals minimiert werden. *1. Set iris for 0.4 video amplitude at TP8 (Y OUT).* *2. Connect oscilloscope to TP6. Mutually adjust R38 and C65 to minimize waveform undulations of the B-Y signal.*



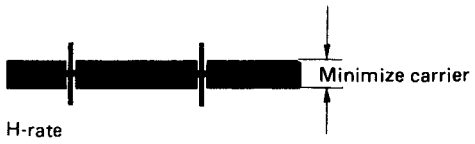
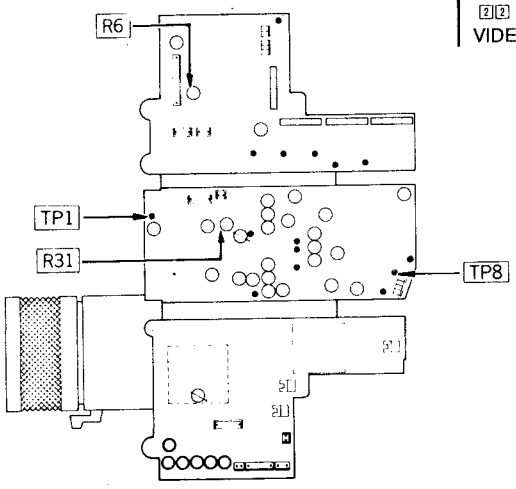


Abb./Fig. 4-9-18

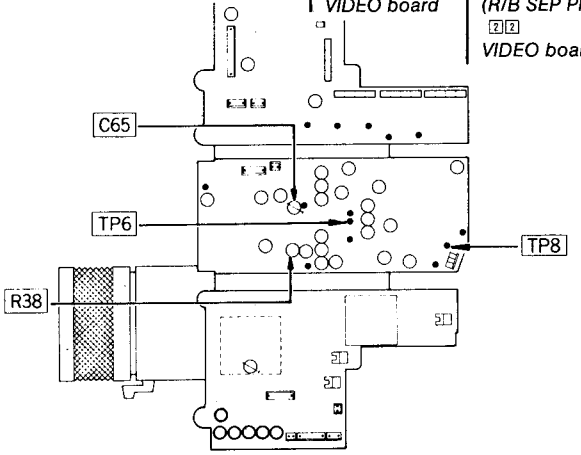


TP1 H-rate **Abb./Fig. 4-9-19**

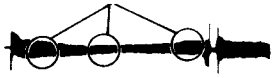
3. Oszilloskop an TP8 anschließen (Y OUT) und R31 zwischen Basis und Weißwertspitze auf 0,7 V einstellen.

3. Connect oscilloscope to TP8 (Y OUT) and adjust R31 for 0.7 V between pedestal and white peak.

H-rate **Abb./Fig. 4-9-20**

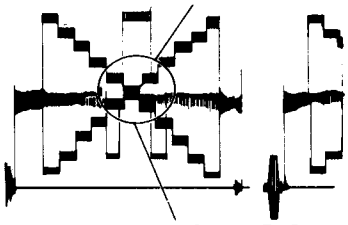
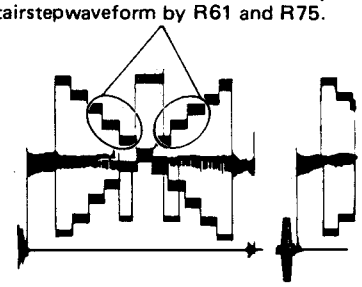


Trägerschwankungen minimieren
Minimize undulation



TP6
H-rate

Abb./Fig. 4-9-21

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
20	YL & R Grundpegel *YL & R setup*	Grauskala *Greyscale*	TP9 (C.OUT) *TP9 (C.OUT)*	R157 (Y.SET UP) R69 (R.SET UP) [2][2] VIDEO Platine *R157 (Y.SET UP)* *R69 (R.SET UP)* [2][2] *VIDEO board*	1. Iris bei TP8 auf 0,2 V Video-Amplitude einstellen (Y OUT). 2. R157 und R69 einstellen, daß bei TP9 die (C.OUT) Trägeramplitude minimiert wird. 1. *Set iris for 0.2 V video amplitude at TP8 (Y OUT).* 2. *Adjust R157 and R69 to minimize overall greyscale carrier amplitude at TP9 (C.OUT).* Minimize carrier **Abb./Fig. 4-9-22**
21	Weißbalance (1) *White balance (1)*	Grauskala *Greyscale*	VIDEO OUT *VIDEO OUT*	R34 (R/B GAIN) R67 (R.GAIN) R60 (R.TRACK-1) [2][2] VIDEO Platine *R34 (R/B GAIN)* *R67 (R.GAIN)* *R60 (R.TRACK-1)* [2][2] *VIDEO board*	1. Iris auf Mittelstellung bringen und R34 und R67 derart einstellen, daß die Trägeramplitude im Zentrum der Grauskala minimiert wird. 2. Empfindlichkeit auf „Up" und R60 und R76 wiederum derart einstellen, daß Trägeramplitude im Zentrum der Grauskala minimiert wird. 1. *Set iris to center click position and adjust R34 and R67 to minimize carrier amplitude at central area of the greyscale.* 2. *Set for high sensitivity and adjust R60 and R76 to again minimize carrier amplitude at central area of the greyscale.* NOR: Adjust R34 and R67 to minimize carrier at the center.  SENS UP: Adjust R60 and R76 to minimize carrier at the center. H-rate **Abb./Fig. 4-9-23(a)**
			VIDEO OUT *VIDEO OUT*	R61 (R.TRACK-2) R75 (B.TRACK-2) [2][2] VIDEO Platine *R61 (R.TRACK-2)* *R75 (B.TRACK-2)* [2][2] *VIDEO board*	3. Empfindlichkeit „STD" R61 und R75 derart einstellen, daß Trägeramplitude in Punkt 7 bis 9 vom Fuß der Grauskala minimiert wird. 3. *At the normal sensitivity setting, adjust R61 and R75 to minimize carrier amplitude at steps 7 to 9 from the bottom of the greyscale.* Minimize carriers at 7th and 9th steps of stairstepwaveform by R61 and R75.  H-rate **Abb./Fig. 4-9-23(b)**

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
22	Chroma Begrenzer *Chroma suppressor*	Grauskala *Greyscala*	Farbmonitor TV *Color monitor TV*	R 50 (C.SUP) [2][2] VIDEO Platine *R50 (C.SUP) [2][2] VIDEO board*	1. Empfindlichkeit auf „UP" und Iris auf Gegenlicht. 2. R50 (C SUP) auf den Punkt einstellen, wo grüne Färbung von den Weißflächen der Grauskala verschwindet. *1. Set sensitivity to high and iris for backlight.* *1. Adjust R50 (C SUP) to the point just where green coloration disappears from the highlight portions of the greyscale.*
23	Weißbalance (2) *White balance (2)*	Grauskala (füllt Bild vollständig aus) *Greyscale (completely filling picture area)*	VIDEO OUT *VIDEO OUT*	R59 (R.TRACK-3) R77 (B.TRACK-3) R60 (R.TRACK-1) R76 (B.TRACK-1) [2][2] VIDEO Platine *R59 (R.TRACK-3)* *R77 (B.TRACK-3)* *R60 (R.TRACK-1)* *R76 (B.TRACK-1)* *[2][2] VIDEO board*	1. Empfindlichkeit auf „STD" bringen und Iris bis zu dem Punkt öffnen, wo Weißflächen der Grauskala begrenzt werden. 2. R59 und R77 einstellen, daß die Trägeramplitude im begrenzten Bereich minimiert wird. 3. Iris auf Mittelstellung. 4. R60 und R76 derart einstellen, daß die Trägeramplitude in Punkt 5 und 6 von der Basis der Grauskala minimiert wird. 5. Empfindlichkeit auf „STD" und auf korrekte Weißbalance überprüfen. Erforderlichenfalls Einstellungen aus Punkt 21 und 23 wiederholen. *1. Set sensitivity to normal and open the iris to the point highlight portions of the greyscale are clipped.* *2. Adjust R59 and R77 in order to minimize carrier amplitude at the limiting region of suppressor effectiveness.* *3. Set iris to center click and sensitivity to high.* *4. Adjust R60 and R76 to minimize carrier amplitude at steps 5 and 6 from the bottom of the greyscale.* *5. Return sensitivity to normal and confirm absence of white balance deviation. If necessary, repeat the adjustments of steps 21 and 23 several times for optimum settings.*

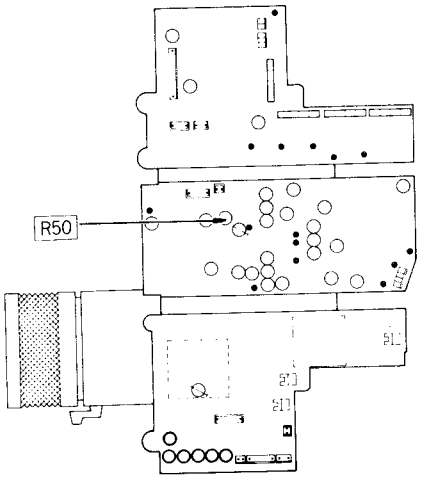
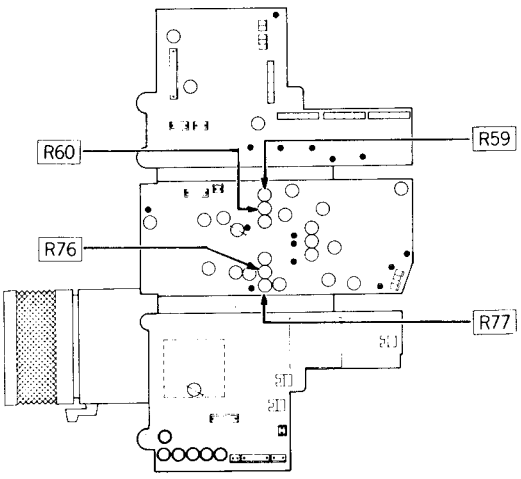


Abb./Fig. 4-9-24



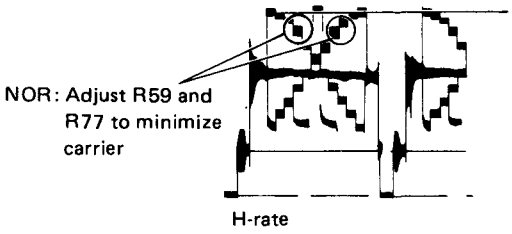


Abb./Fig. 4-9-25(a)

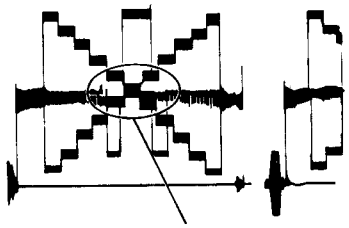
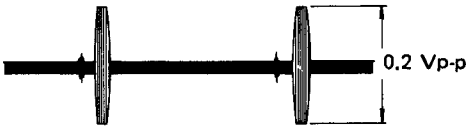
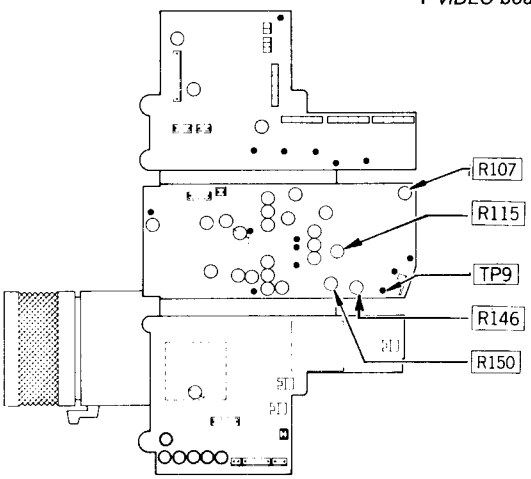
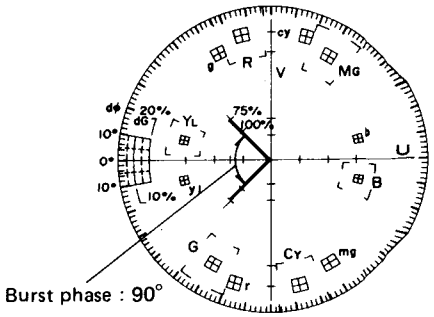
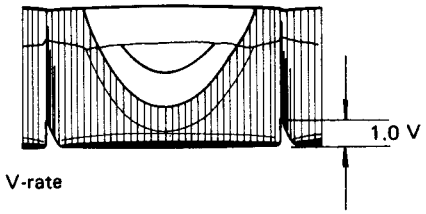
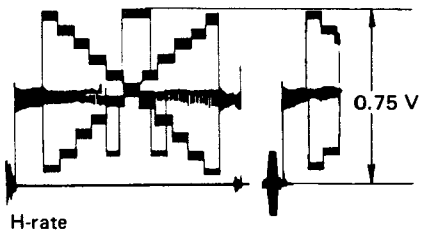


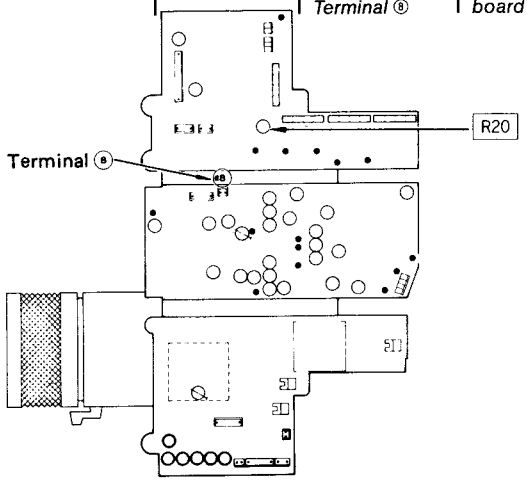
Abb./Fig. 4-9-25(b)

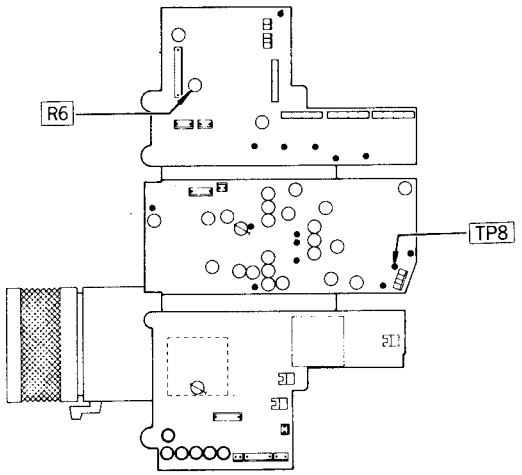
ACHTUNG: R115 (C.GAIN), R107 (B-Y GAIN) und R150 (SC PHASE) wurden im Herstellerwerk eingestellt und brauchen nicht verändert zu werden. Folgende Schritte sind nur im Bedarfsfall durchzuführen.

IMPORTANT: R115 (C.GAIN), R107 (B-Y GAIN) and R150 (SC PHASE) have been pre-adjusted at the factory and ordinarily do not require readjustment. Perform the following steps only when unavoidable.

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
24	Encoder	Iris geschlossen	TP9 (C.OUT)	R146 (S.C GAIN) [2][2] VIDEO Platine	1. Überprüfen Sie, ob die Einstellungen bis Weißbalance und der Farbmonitor korrekt eingestellt sind. 2. Oszilloskop an TP9 (C.OUT) anschließen und Burstsignal beobachten. 3. R146 (S.C GAIN) auf eine Burstsignalamplitude von 0,2 V s-s einstellen.
	Encoder	*Iris closed*	*TP9 (C.OUT)*	*R146 (S.C GAIN)* [2][2] *VIDEO board*	*1. Confirm that adjustments through white balance have been completed and the employed color monitor is correctly adjusted.* *2. Connect oscilloscope to TP9 (C.OUT) and observe burst signal.* *3. Adjust R146 (S.C GAIN) for burst signal amplitude of 0.2 V p-p.*
					 **Abb./Fig. 4-9-26**
		Iris geschlossen	VIDEO OUT Vektorskop	R150 (S.C PHASE) [2][2] VIDEO Platine	4. Die Phase der Burstsignale im Vektorskop muß 90° betragen. Erforderlichenfalls R150 derart einstellen, daß diese Phase erzielt wird.
		Iris closed	*VIDEO OUT Vectorscope*	*R150 (S.C PHASE)* [2][2] *VIDEO board*	*4. Confirm that the phase of burst signals are 90° at the vectorscope. If necessary, adjust R150 so that the phase of burst signals become 90°.*
					
					 **Abb./Fig. 4-9-27**
		Farbvorlage (Gesicht)	Farbmonitor TV	R115 (C.GAIN) R107 (B-Y GAIN) [2][2] VIDEO Platine	5. Eine Farbvorlage (Gesicht) aufnehmen und Display auf einem richtig eingestellten Monitor betrachten. R115 (C.GAIN) auf korrekte Farbstärke einstellen. 6. Eine Farbvorlage (Gesicht) und Display am Monitor betrachten. R107 (B-Y GAIN) vorsichtig einstellen, so daß möglichst natürliche Hautfarbtöne sowie R, G und B erzielt werden. 7. Oben genannte Schritte so oft wie nötig wiederholen.
		Color camera subject	*Color monitor TV*	*R115 (C.GAIN) R107 (B-Y GAIN)* [2][2] *VIDEO board*	*5. Pick up a color camera subject and observe the display on a properly adjusted color monitor. Adjust R115 (C.GAIN) for suitable color value.* *6. Pick up color camera subject and observe monitor display. Carefully adjust R107 (B-Y GAIN) for most natural R, G, B and skintone colors.* *7. Repeat the above steps several times for optimum settings.*

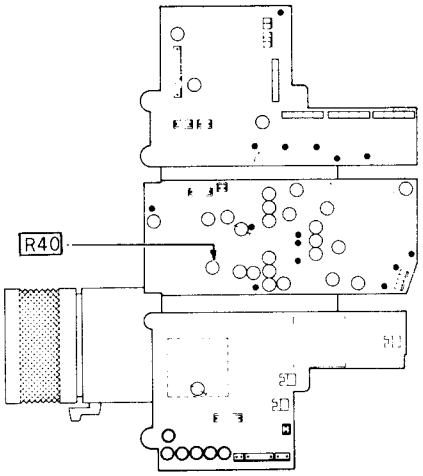
Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
25	Ecken-Farbreinheit *Corner shading*	Iris geschlossen *Iris closed*	2 3 EE & IND-Seite Flex. Leiterplatte Terminal ⑧ 2 3 *EE & IND side Flexible board Terminal ⑧*	R20 (DBL.SH) 2 3 EE & IND Platine *R20 (DBL.SH)* 2 3 *EE & IND board*	Oszilloskop mit Terminal ⑧ verbinden und R20 auf 1,0 V einstellen. *Connect oscilloscope to terminal ⑧ and adjust R20 for 1.0 V corner shading waveform.*  **Abb./Fig. 4-9-28**
26	E-E *E-E*	Grauskala (füllt Bild völlig aus) *Greyscale (completely filling picture area)*	TP8(Y.OUT) 2 2 VIDEO Platine *TP8(Y.OUT)* 2 2 *VIDEO board*	R2 (E-E SUB) 2 4 C.CTL R6 (IRIS) 2 3 EE & IND Platine *R2 (E-E SUB)* 2 4 *C.CTL* *R6 (IRIS)* 2 3 *EE & IND board*	1. Iris (R1) auf Mittelstellung und R2 (E-E SUB) bei CN-E5(8) auf 3,2 V DC einstellen. 2. R6 auf 0,75 V zwischen Grauskalabasis und Weißwertspitze einstellen. 1. *Set iris (R1) to center click position and adjust R2 (E-E SUB) for DC 3.2 V at CN-E5-(8).* 2. *Adjust R6 for 0.75 V between greyscale pedestal and white peak.*  **Abb./Fig. 4.9.29**





4.9.4 Andere Einstellungen – Others

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
27	V-Korrelation *Vertical correlation error*	Grauskala *Greyscale*	Farbmonitor TV *Color monitor TV*	R40 (V.EDGE) [2][2] VIDEO Platine *R40 (V.EDGE) [2][2] VIDEO board*	1. Kamera um 15° neigen. R40 derart einstellen, daß Färbung an vert. Kanten minimiert wird. 2. Display betrachten und Einstellungen aus Punkt 16 und 21 ggf. wiederholen, wenn die Weißbalance abweicht. *1. Tilt the greyscale about 15°. Adjust R40 to minimize coloration at the vertical edges.* *2. Observe the monitor display and if white balance has deviated, repeat the adjustments of step 16 and those of step 21 and subsequent.*
28	Anzeigen *Indicator*	Iris geschlossen *Iris closed*	EVF (CRT) *EVF (CRT)*	R52 (IND OSC) [2][3] EE & IND Platine *R52 (IND OSC) [2][3] EE & IND board*	R52 derart einstellen, daß die Blinkanzeige 1/5 der horizontalen Breite des Schirms einnimmt. *Adjust R52 so that flashing indication of the electronic viewfinder is 1/5 the horizontal width of the screen.*



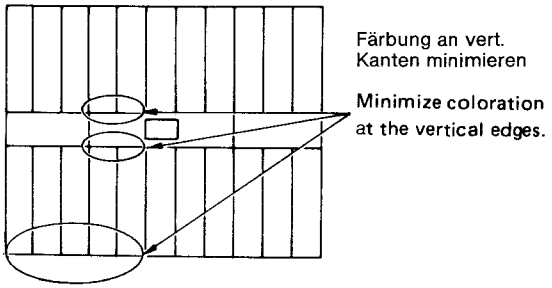
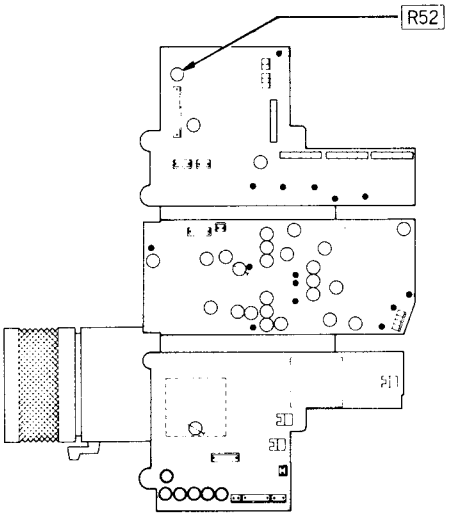


Abb./Fig. 4-9-30



Electronic viewfinder (CRT)

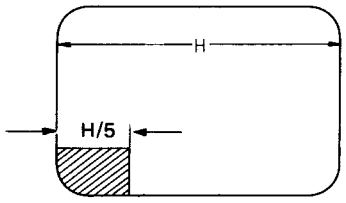
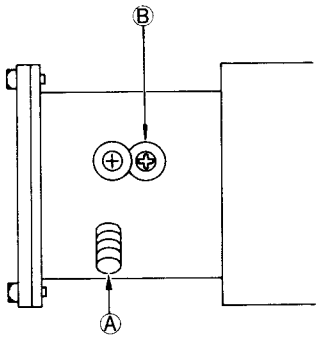
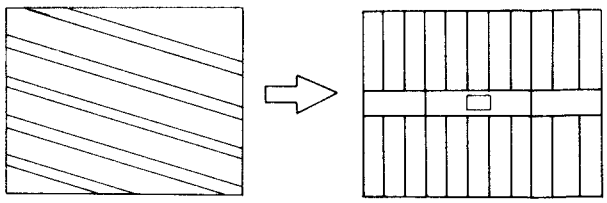


Abb./Fig. 4-9-31

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
29	Rück-Focus *Back focus*	Iris voll geöffnet Gegenstand weiter als 100 m entfernt *Iris-Fully open Subject more than 100 m distant*	Farbmonitor TV *Color monitor TV*	Rück-Focus Schraube *Back focus screw*	1. ND-Filter anbringen und Iris öffnen. Einen Gegenstand in mind. 100 m Entfernung aufnehmen. 2. Stellschraube lösen (A): Zoomring auf 8 mm und Brennpunktring auf „unendlich" einstellen. 3. Zoomring auf TELE (48 mm) einstellen und richtigen Brennpunkt am Display prüfen. 4. Einen Gegenstand in etwa 10 m Entfernung aufnehmen. Zooming durchführen. Der Gegenstand muß im Brennpunkt bleiben. 1. *Install ND filter and open iris. Pick up a camera subject at least 100 meters (330 ft.) distant.* 2. *Loosen setscrew (A); set the zoom ring to maximum wide (8 mm) and the focus ring to infinity (∞).* 3. *Set the zoom ring to TELE (48 mm) and check for proper focus on the monitor display.* 4. *Pick up a camera subject about 10 meters (33 ft) distant. Zoom in and zoom out. Confirm that the subject remains in focus.*  **Abb./Fig. 4-9-32** 5. Stellschraube (A) anziehen und richtigen Brennpunkt überprüfen. 5. *Tighten setscrew (A) and again check for proper focus.*

4.9.5 Suchermonitor – Electronic Viewfinder

Anm.: Auf die Hochspannung führende CRT-Anode, HV-Modul usw. ist zu achten!
Note: Pay the most careful attention to CRT anode, HV module, etc. which are loaded with high voltage.

Nr. No.	Pos. Item	Modus Mode	Prüfpunkt Check Point	Einstell-punkte Adjustment Parts	Einstellungen & Prüfungen Adjustment & Checkup
30	Zeile *Horizontal sync*	Grauskala od. S/W-Testbild *Greyscale or monoscope*	EVF (CRT) *EVF (CRT)*	VR103 (H.HOLD) [28] VF(1) *VR103 (H.HOLD) [28] VF(1)*	1. Monitor beobachten und VR103 im Uhrzeigersinn drehen. 2. VR103 langsam gegen Uhrzeigersinn drehen, bis sich das Bild stabilisiert hat. Mit Filzstift diesen Punkt markieren. 3. VR103 gegen Uhrzeigersinn drehen. 4. VR103 langsam im Uhrzeigersinn drehen, bis sich das Bild stabilisiert hat. Mit Filzstift diese Stelle markieren. 5. Danach VR103 auf die Mitte zwischen den beiden Markierungspunkten einstellen. *1. While observing the viewfinder, turn VR103 fully clockwise.* *2. Gradually turn VR103 counterclockwise to where the picture stabilizes. Use a felt pen to mark this position.* *3. Turn VR103 fully counterclockwise.* *4. Gradually turn VR103 clockwise to where the picture stabilizes. Use a felt pen to mark this position.* *5. Finally, set VR103 to the midpoint between the two markings.*  (a) (b) **Abb./Fig. 4-9-33**
31	Bildamplitude *Vertical scanning*	Grauskala od. S/W-Testbild *Greyscale or monoscope*	EVF (CRT) *EVF (CRT)*	VR102 (V.HEIGHT) [28] VF(1) *VR102 (V.HEIGHT) [28] VF(1)*	1. Sucherbild beobachten und mit VR102 normale Bildhöhe einstellen. *1. Observe the viewfinder and adjust VR102 for normal picture amplitude.*
32	Bildlage *Centering*	S/W-Testbild *Monoscope pattern*	EVF (CRT) *EVF (CRT)*	Zentriermagnet *Centering magnet*	1. Mit dem Zentriermagneten die Bildlage einstellen. *1. Supply a monoscope signal and adjust the deflection yoke centering magnet for uniform corner dimensions.*
33	Focus *Focus*	Grauskala *Greyscale*	EVF (CRT) *EVF (CRT)*	VR201 (FOCUS) [29] VF(2) *VR201 (FOCUS) [29] VF(2)*	1. Sucherbild beobachten und mit VR201 scharfes Bild einstellen (Kameraeinstellung am TV-Monitor prüfen). *1. Observe the viewfinder picture and adjust VR201 for clear reproduction of the greyscale central position.*
34	Helligkeit *Brightness*	Grauskala *Greyscale*	EVF (CRT) *EVF (CRT)*	VR202 (BRIGHT) [29] VF(2) *VR202 (BRIGHT) [29] VF(2)*	1. Blende schließen und mit VR202 den Punkt einstellen, wenn das Raster gerade sichtbar wird. *1. Close the iris and adjust VR202 to where the viewfinder CRT raster is just barely visible.*
35	Kontrast *Contrast*	Grauskala *Greyscale*	EVF (CRT) *EVF (CRT)*	VR104 (CONTRAST) [28] VF(1) *VR104 (CONTRAST) [28] VF(1)*	1. Sucherbild beobachten und VR104 so einstellen, daß alle Abstufungen der Grauskala erkennbar sind. *1. Observe the viewfinder picture and adjust VR104 for optimum reproduction of the greyscale steps.*

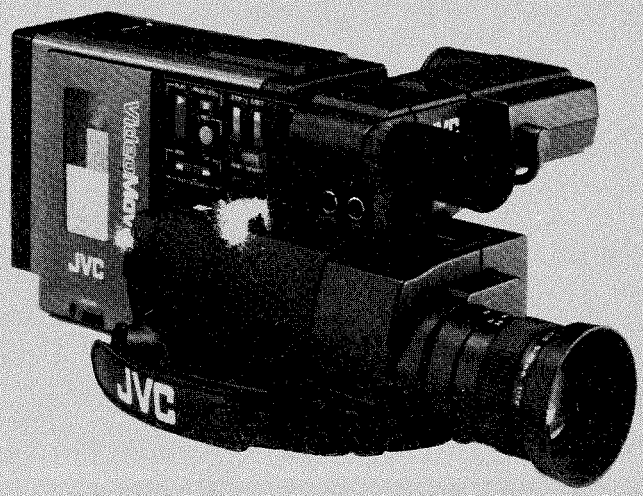
JVC

SERVICE MANUAL

VHS VIDEO MOVIE VHSC

GR-C1 EG AA-P1 EG BB-P1 EG AP P1 E

ERSATZTEILLISTE



SPEZIFIKATION

Format	:	VHS standard
Power source	:	9.6 V ⎓
Power consumption	:	7.6 watts (nominal in the record mode)
Signal system	:	PAL
Recording system	:	Luminance: FM recording Colour: Converted sub-carrier direct recording Conforms to VHS standard
Cassette	:	VHS-C cassette
Tape speed	:	23.39 mm/sec.
Recording time Max.	:	30 minutes (with EC-30 cassette)
Video		
Output	:	1 Vp-p, 75 ohms, unbalanced (via VIDEO/AUDIO OUT connector)
S/N ratio	:	40 dB (with Rohde & Schwarz noise meter)
Audio		
Output	:	−6 dBs, 1 k-ohm (via VIDEO/AUDIO OUT connector)
Microphone input	:	−68dBs, 10 k-ohms, unbalanced
Pick up tube	:	1/2" High-Band Saticon*, single-carrier frequency separation system
Minimum required illumination	:	15 lux (at f/1.2 with sensitivity switch set to UP)
Illumination range	:	15 – 100,000 lux (auto iris mode with sensitivity switch set to UP)
Lens	:	f/1.2, f = 8 – 48 mm, 6 : 1 power zoom lens with auto iris control and macro position, filter diameter 49 mm
Viewfinder	:	Electronic viewfinder with 1/2" (12.7 mm) black/white CRT
Colour temperature switching	:	Switchable filter (3,200 K/5,200 K)
White balance adjustment	:	Automatic/preset standard
Operating temperature	:	0°C to +40°C
Operating humidity	:	Less than 80%
Storage temperature	:	−20°C to +30°C
Weight	:	1.9 kg (with viewfinder)
Dimensions	:	108 (W) x 136 (H) x 314 (D) mm (excl. viewfinder, lens hood and battery pack) 176 (W) x 136 (H) x 340 (D) mm (incl. viewfinder, lens hood and NB-P5U battery pack)

*Saticon is a registered trademark.

Design and specifications subject to change without notice.

No. 8361-T4
August 1984

EXPLOSIONSZEICHNUNGEN UND TEILELISTEN
EXPLODED VIEWS AND PARTS LIST

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Sicherheitshinweise
Teile, die mit diesem ⚠ Symbol gekennzeichnet sind, sind wichtig für die Sicherheit des Gerätes und deswegen nur durch Originalteile zu ersetzen.

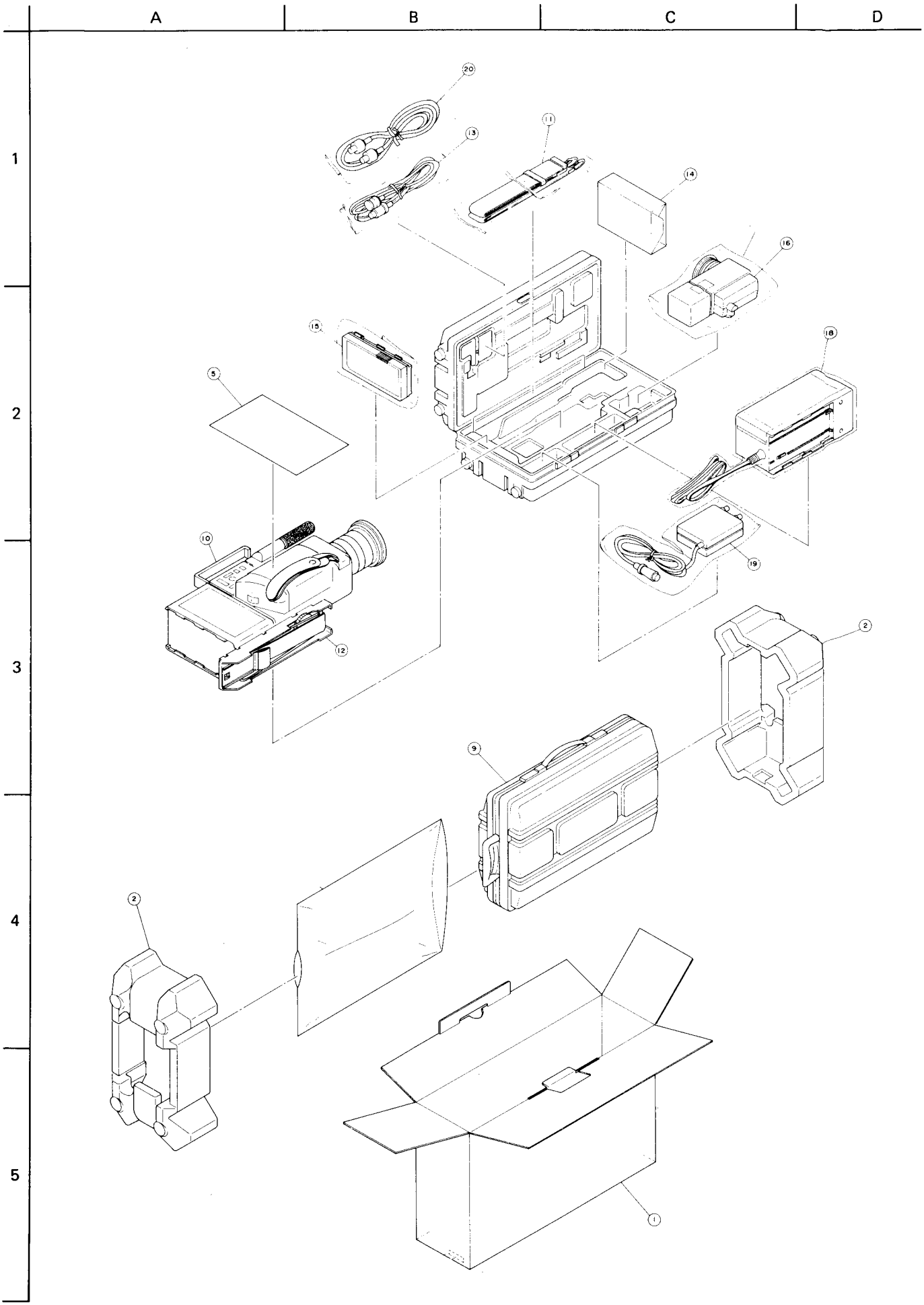
Safety Precaution
Parts identified by the ⚠ symbol are critical fo safety. Replace only with specified part numbers.

Ersatzteile, die nicht in dieser Liste enthalten sind, bitte mit der Schaltbildposition bestellen.

Ersatzteile sind zu bestellen im JVC-Ersatzteildienst:
Zentrale Eschborn, Telefon-Durchwahl: 06196-496123, 496128, Telex: 417499

7.2 EXPLOSIONSZEICHNUNGEN UND TEILELISTE

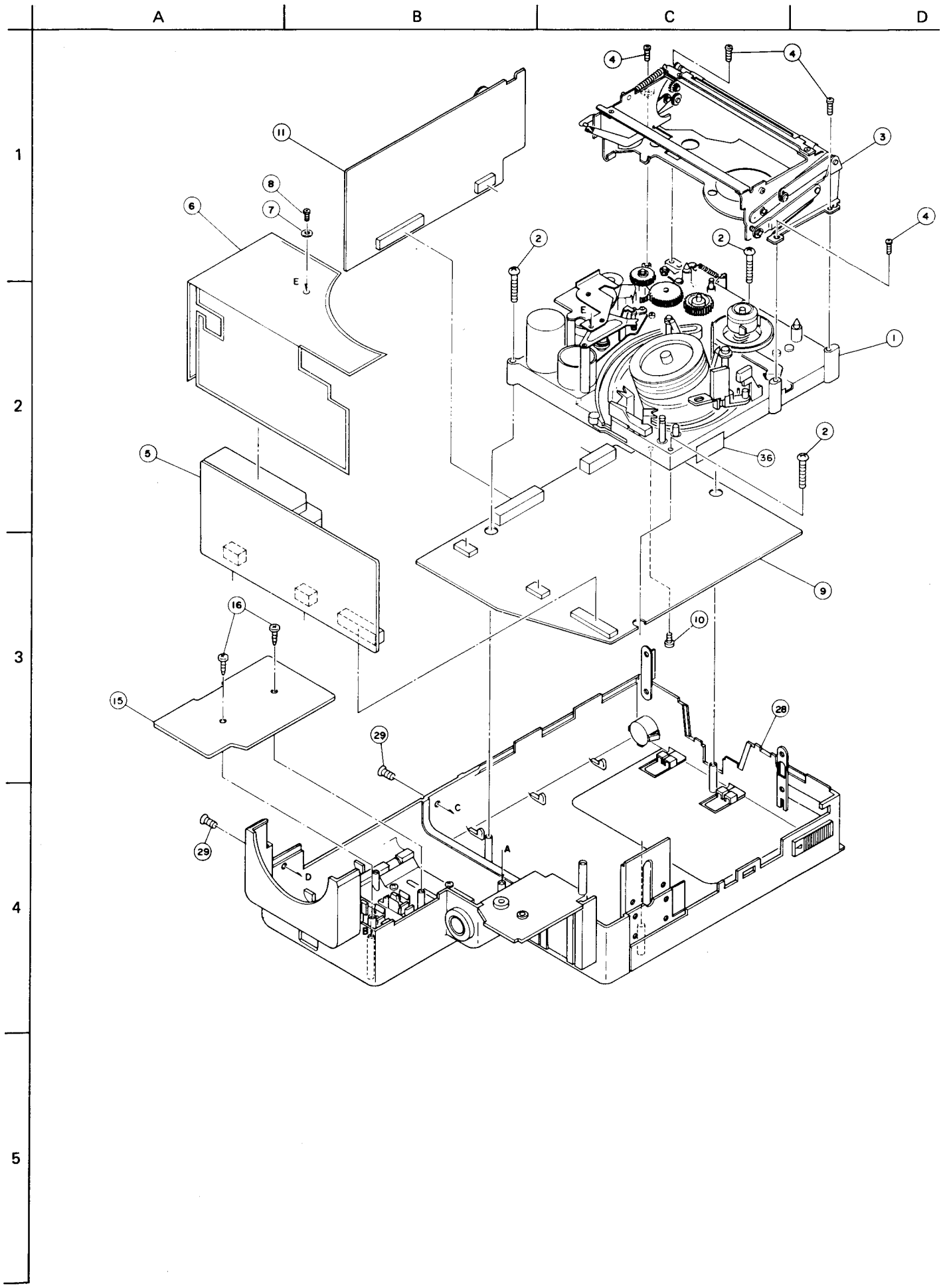
7.2.1 Verpackungsmaterial und Zubehör



Packliste

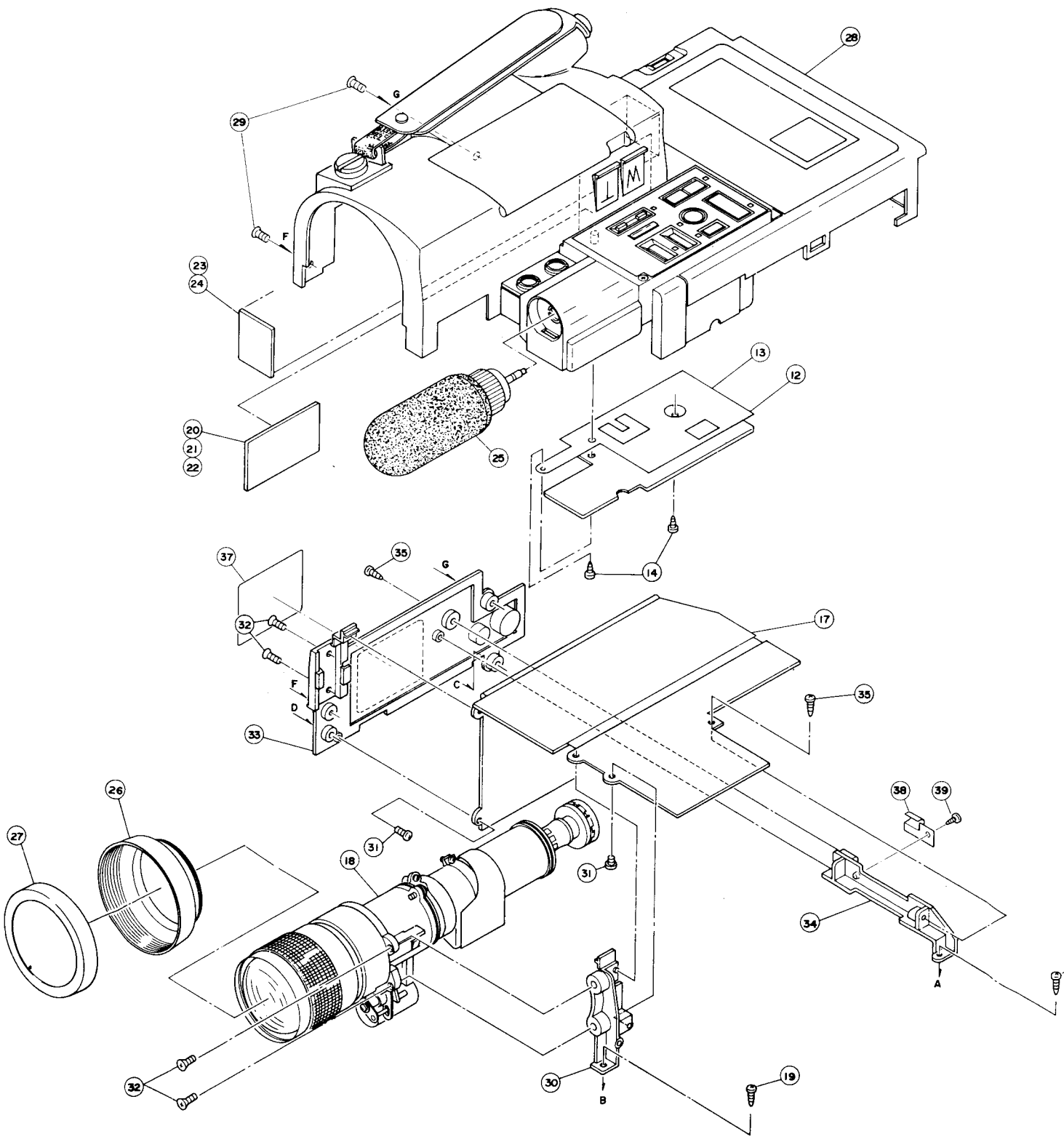
Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
1	PQ30422	Packing Case	EG
2	PQ20124	Cushion	
⚠ 5	PU30425-675	Instruction Book	EG
9	CB-P1U	Carrying Case	Bitte als Zubehör bestellen
10	PU56809	Carrying Handle	
11	PU11024-010	Shoulder Belt	
12	PU11024-011	Shoulder Frame	
13	PU57395	Cable Assembly	
14	EC30		Bitte als Zubehör bestellen
15	NBP5U	Battery Pack (S)	Bitte als Zubehör bestellen
16	PU56309D	E. VF Assembly	See Sect. 7.2.7.
18	BB-P1EG	Battery Charger	
19	PU11059E	RF Unit	See Sect. 9.2.
20	PU43294J	Aerial Cable Ass'y	

7.2.2 Baugruppen



7.2.2 Baugruppen

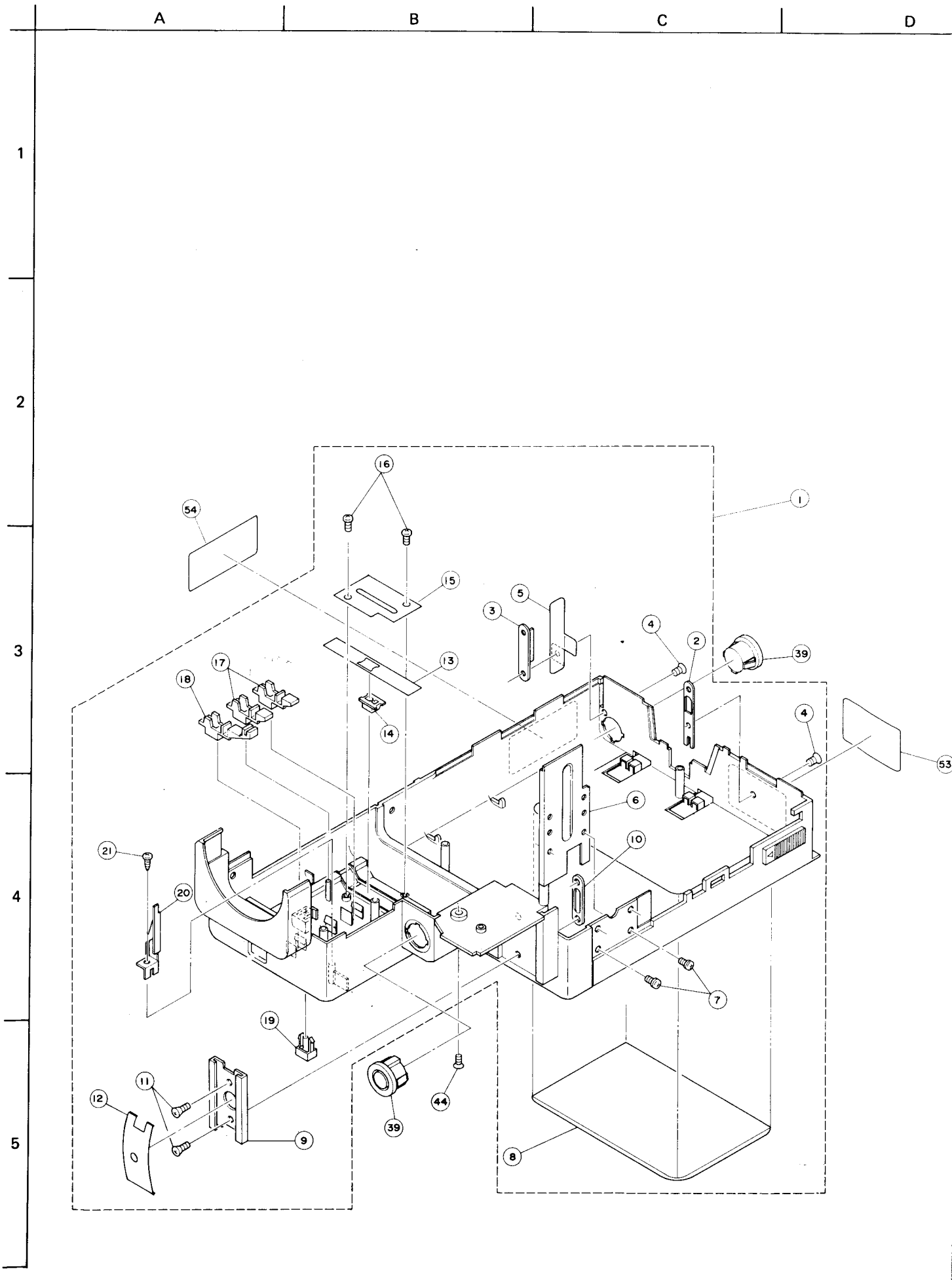
D	E	F	G



Baugruppenliste

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
1	-	Mechanism Assembly	See Sect. 7.2.4 and 7.2.5
2	SPSG2620Z	Tapping Screw	
3	PUS27110E	Housing Assembly	
4	SPSH1740M	Screw	
5	-	Y/C Board Assembly	See Sect. 8.2.2
6	PU35239-1-4	Shield Plate	
7	WSB2000N	Washer	
8	SPSH1740M	Screw	
9	-	Mechacon/Servo Board Ass'y	See Sect. 8.2.1
10	SPSH1760R	Screw	
11	-	Audio/Servo Board Ass'y	See Sect. 8.2.3
12	-	Operation Board Ass'y	See Sect. 8.2.4
13	PU57039-1-1	Shield Plate	
14	SDSA2005Z	Tapping Screw	
15	-	Camera Control Board Ass'y	See Sect. 8.2.10
16	SDSA2608Z	Tapping Screw	
17	PU10915F-C	Camera Board Ass'y	
18	PU56296	Optical Block Ass'y	See Sect. 7.2.6
19	SDSA2608M	Tapping Screw	
20	PU56358C	Zoom Switch Board Ass'y	Incl. 21 - 22
21	PU57008	Push Switch	
22	QCF81HZ-104ZL	Chip Capacitor	C1, C2
23	PU56359B	Trigger Switch Board Ass'y	Incl. 24
24	PU57605	Tact Switch	
25	PU56308-4	Mic Ass'y	
26	PU56298	Hood	
27	PU56299	Hood Cap	
28	-	Cabinet Ass'y	See Sect. 7.2.3
29	SSSP2606M	Screw	
⚠ 30	PQ30223	Camera Frame (Upper)	
31	SDSA2606Z	Tapping Screw	
32	SSSP2606M	Screw	
⚠ 33	PQ20046A-7	Camera Frame (Lower)	
⚠ 34	PQ30218-1-4	Camera Frame (Center)	
35	SDSA2608M	Tapping Screw	
36	PU56999	Sheet	for M/S CN8
⚠ 37	PQ30229-3	Rating Label	
38	PU57300	GND Lug	
39	SDSA2006Z	Tapping Screw	

7.2.3 Gehäuse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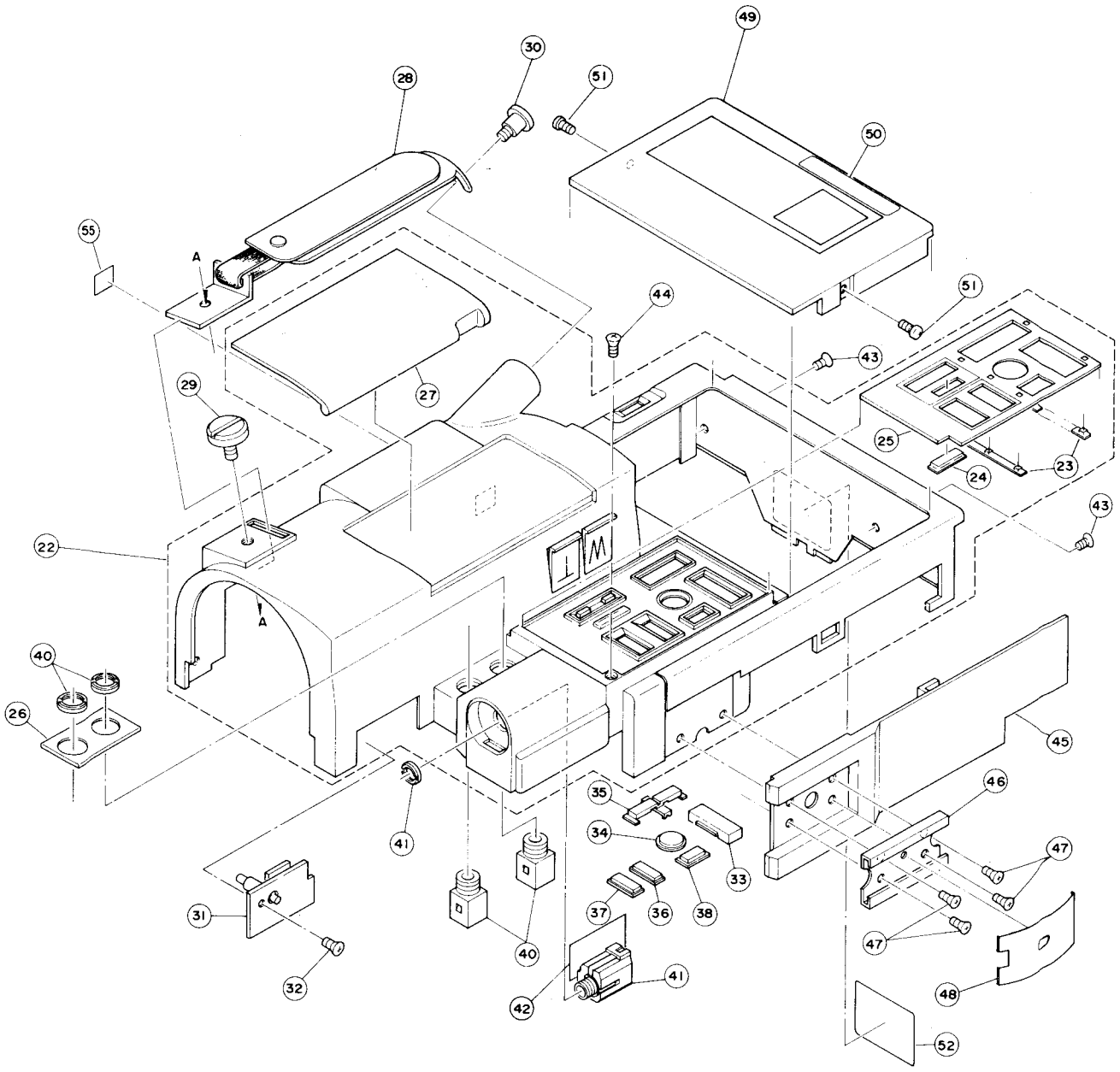
7.2.3 Gehäuse

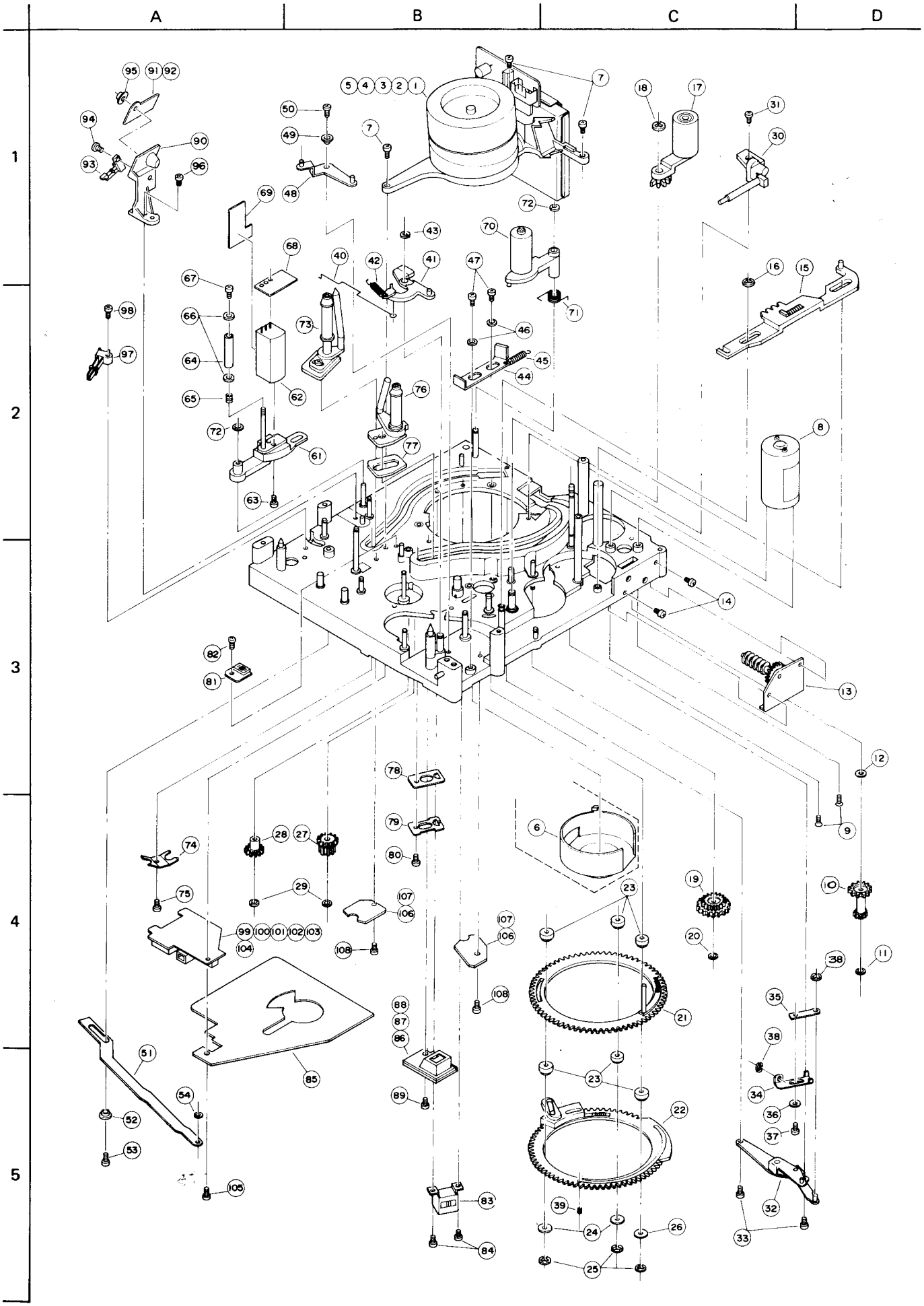
E	F	G	H



Gehäuseteilliste

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ 1	PQ10052D-13	Lower Case Ass'y	Incl. 2 - 21
2	PQ40509-1-1	Bracket	
3	PQ40508-1-2	Bracket (3)	
4	SSSP2604M	Screw	
5	PU56998	Sheet	
6	PQ41171-1-4	Bracket	
7	LPSP2604Z	Screw	
8	PQ40487-1-4	Face Pad	
9	PQ40511	Shoe (2)	
10	PQ40956	Bracket	
11	SSSP2606M	Screw	
12	PQ41041	Spring (1)	
13	PQ40486	S. VR Plate	
14	PQ30221	S. VR Knob	
15	PQ41007-1-2	Plate	
16	SBSB2003Z	Tapping Screw	
17	PQ30222-1-3	Slide Knob	
18	PQ30220-1-3	Filter Knob	
19	PQ40501	W/B Knob	
20	PQ40982A-2	Lever Ass'y	
21	SDSA2608Z	Tapping Screw	
⚠ 22	PQ10051B-6	Upper Case Ass'y	Incl. 23 - 27
23	PQ40498	Indicator (1)	
24	PQ40500	Window	
25	PQ40489-2-3	Operation Plate	
26	PQ40488-2-3	Mic Plate	
27	PQ30225-1-6	Grip Rubber	
⚠ 28	PQ30230B	Grip Belt Ass'y	
29	PU53950-1-1	Belt Screw	
30	PU53943	Belt Screw (B)	
31	PQ30308B-4	Iris Lock Ass'y	
32	SSSA2610M	Tapping Screw	
33	PQ40491	Button	PLAY
34	PQ40492	Button	REC
35	PQ40493	Button	FF/REW
36	PQ40494	Button	STOP
37	PQ40495	Button	EJECT
38	PQ40497	Button	PAUSE
⚠ 39	PU52037	VF Socket	
40	QMS3501-013	Jack	REMOTE, EARPHONE
41	PU56808	Jack	MIC
42	PQ41264	Plate	
43	SSSP2604M	Screw	
44	SDSA2610M	Tapping Screw	
⚠ 45	PQ20045-2-7	Top Plate	
46	PQ40510-1-4	Shoe (1)	
47	SSSP2606M	Screw	
48	PQ41041	Spring (1)	
⚠ 49	PQ30369D	Cassette Cover Ass'y	Incl. 50
50	PQ41245-2	Label	
51	SDSP2004M	Screw	
52	PQ30325-2	Battery Label	
53	PU56968-3	Battery Caution Label	
54	PU54705-2	Caution Label	
⚠ 55	-	F Mark Label	

7.2.4 Mechanismus (1)



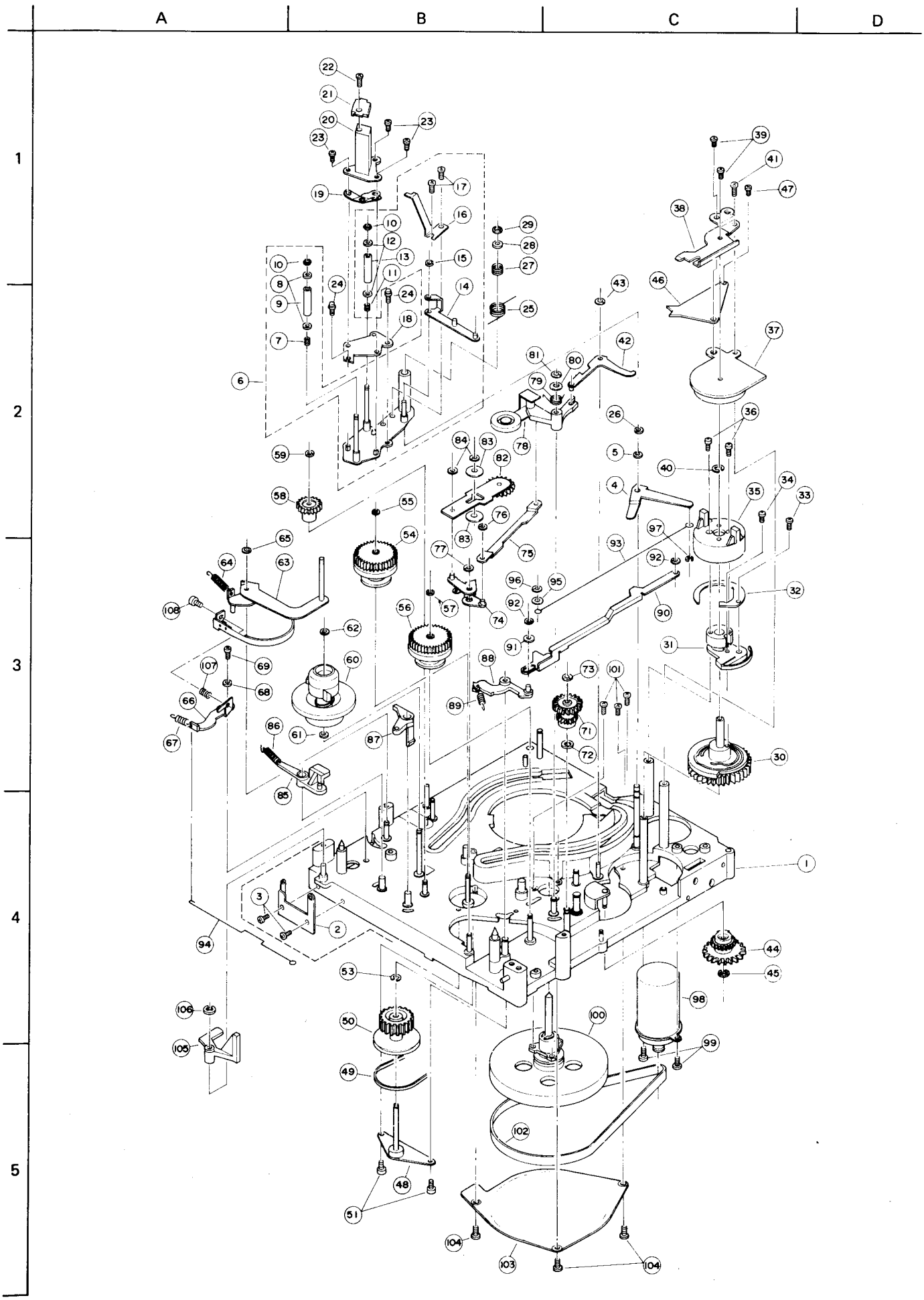
Mechanismus

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ 1	PUS27124C	Drum Ass'y	Incl. 2 - 6
2	PQ20050C-2	Upper Drum Ass'y	
3	SPSH1780N	Screw	for U. Drum
4	MCM1049P	Pre-amp Ass'y	IC1
5	DPSP2005Z	Screw	for Pre-amp
6	PU56422-2	Brush	
7	SPSK1760M	Screw	
⚠ 8	PU56466V	Mode Control Motor	
9	SSSP2004Z	Screw	
10	PQ40529-1-2	Loading Gear (1)	
11	PQM30017-14	Slit Washer	
12	Q03093-829	Washer	
13	PQ40530A-5	Loading Gear Bracket Ass'y	
14	LPSP2004Z	Screw	
15	PQ41059A-2	Pinch Roller Bar Ass'y	
16	REE2500	E-Ring	
17	PQ41062A-2	Pinch Roller Arm Ass'y	
18	REE2500	E-Ring	
19	PQ40637-1-2	Loading Gear (6)	
20	PQM30017-14	Slit Washer	
21	PQ40635A-5	Loading Ring Ass'y	Take-up
22	PQ40750A-3	Loading Ring Ass'y	Supply
23	PQ40642	Guide Roller	
24	PQM30018-10	Spacer	
25	REE1500	E-Ring	
26	PQM30018-26	Spacer	
27	PQ41133	Ring Idler Gear (1)	
28	PQ41132	Ring Idler Gear (2)	
29	PQM30017-14	Slit Washer	
30	PQ40924A-3	Middle Pole Ass'y	
31	SSSH1740M	Screw	
32	PQ40674A	Middle Pole Control Ass'y	
33	SPSK1750M	Screw	
34	PQ40668	Connect Plate (1)	
35	PQ40669	Connect Plate (2)	
36	PQM30018-11	Washer	
37	SPSK1430M	Screw	
38	REE1500	E-Ring	
39	PQ40658	Collar	
40	PQ40691	Rod	
41	PQ40702A-3	Brake Lever Ass'y	Take-up, Incl. 42
42	PQM30001-144-4	Spring	
43	PQM30017-19	Slit Washer	
44	PQ40706A	Brake Plate Ass'y	Incl. 45
45	PQM30001-148	Spring	
46	PQM30013-3	Flange Collar	
47	SPSK1740M	Screw	
48	PQ40708A	Tension Lever Ass'y	
49	PQM30013-4	Flange Collar	
50	SPSK1740M	Screw	
51	PQ40710	Tension Bar	
52	PQM30013-4	Flange Collar	
53	SPSK1740M	Screw	
54	PQM30017-14	Slit Washer	
55	-	-	

Mechanismus

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
56	-	-	
57	-	-	
58	-	-	
59	-	-	
60	-	-	
61	PQ30238A	Erase Head Arm Ass'y	
62	PU56330	Full Erase Head	
63	SPSP2003Z	Screw	
64	PQ41134-3	Tape Guide	Supply
65	PQM30002-152	Spring	
66	PQ41135-3	Guide Flange	
67	SSSH1450M	Screw	
68	-	F. E. Head Board Ass'y	See Sect. 8.2.5.
69	PQ41316	Sheet	
70	PQ41173A	Impedance Roller Arm Ass'y	
71	PQ40729	Spring	
72	PQM30017-19	Slit Washer	
73	PUS46500B	Pole Base Ass'y	Supply
74	PQ40599	Slide Plate	Supply
75	SPSK1720M	Screw	
76	PUS46499C	Pole Base Ass'y	Take-up
77	PQ40730	Slider Spring	
78	PQ40731	Slide Washer	
79	PQ40732	Slide Plate	Take-up
80	SPSK1740M	Screw	
81	PU56420	Dew Sensor	
82	SPSK1730M	Screw	
83	PU56421	PU Head	
84	SPSK1740M	Screw	
85	PQ40608	Cover Sheet	
86	PQ40734	End Sensor Mold	
87	TLN107A	IR LED	
88	PU56397-1-2	End Sensor-1 Board	
89	SPSK1740M	Screw	
90	PQ40735-2-4	End Sensor Bracket	
91	TPS605	Photo Transistor	
92	PU56398	End Sensor-2 Board	
93	PU57130	Cassette Switch	
94	SPST2606Z	Tapping Screw	
95	PU48793	Cap	
96	SPSK1740M	Screw	
97	PU55378-2	REC Safety Switch	
98	SPSK1760M	Screw	
99	PU56393A-2	Junction-1 Board Ass'y	Incl. 100 - 103
100	PU56260-14	Cap. Housing	CN1
101	PU53587-2R	Cap. Housing	CN2, CN7
102	PU53587-2	Cap. Housing	CN3 - CN6
103	PU53587-4	Cap. Housing	CN8
104	QEE41AM-685	Tantal. Capacitor	C1
105	SPSK1740M	Screw	
106	PU56395-1-2	Reel Sensor Board	
107	GP2L04B	Photo Sensor	
108	SPSK1740M	Screw	

7.2.5 Mechanismus (2)

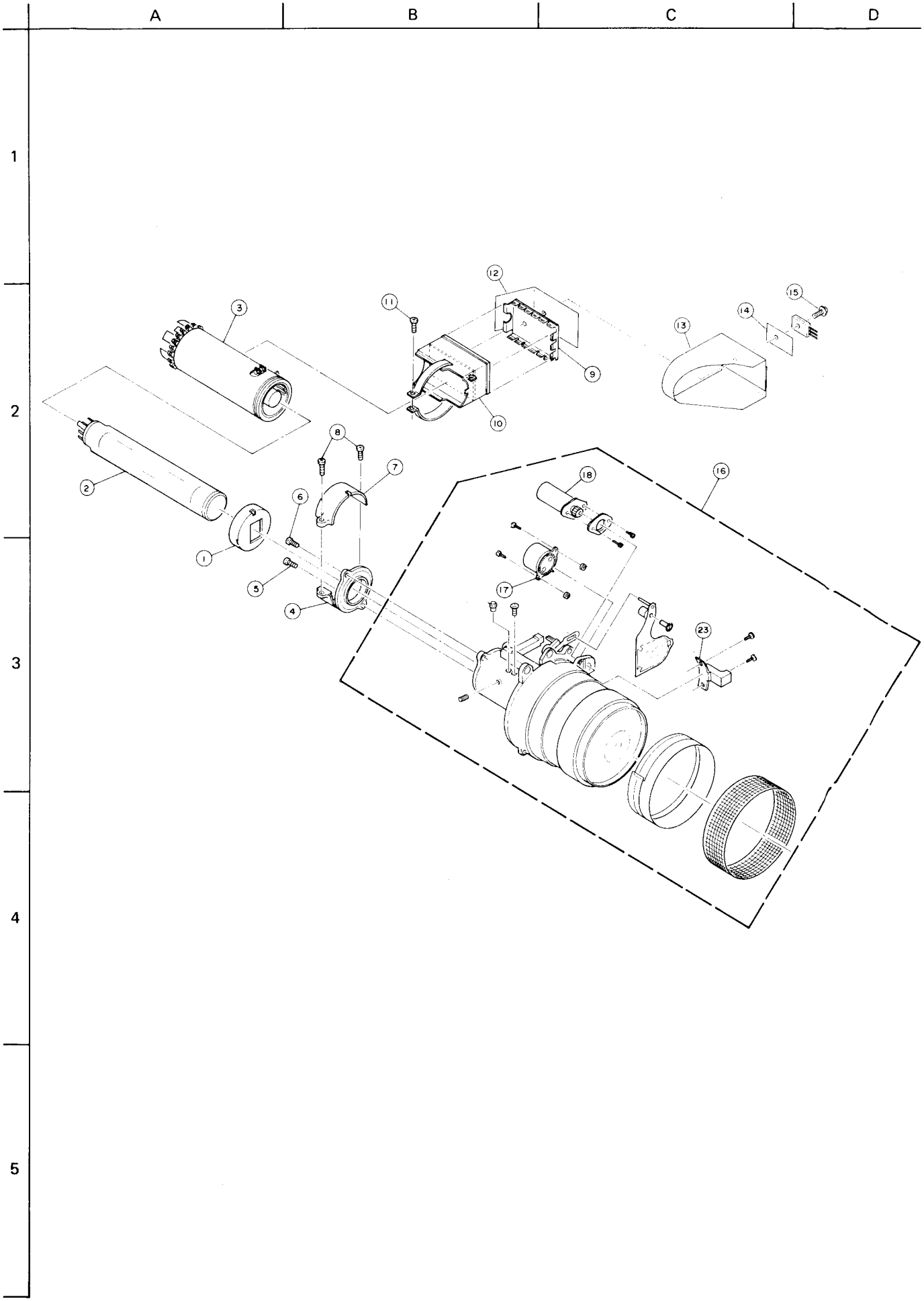


Mechanismus (2)

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
1	PQ10116A-2	Main Deck Ass'y	Incl. 2 - 3
2	PQ41236	REC Lever Bracket	
3	SPSK1740M	Screw	
4	PQ40548A	Brake Control Arm Ass'y	
5	REE2500	E-Ring	
6	PQ41152A-4	A/C Head Ass'y	Incl. 7 - 17
7	PQM30002-152	Spring	
8	PQ41135-1	Guide Flange	
9	PQ41134-1	Tape Guide (1)	
10	NNB1700N	Nut	
11	PQM30002-128	Spring	
12	PQ41135-2	Guide Flange	
13	PQ41134-2	Tape Guide (2)	
14	PQ40622A	Search Control Arm Ass'y	
15	PQM30017-15	Slit Washer	
16	PQ41128-1-3	Middle Pole Holder	
17	SPSK1420M	Screw	
18	PQ41130-1-1	A/C Head Base	
19	PQ41403	Head Spring	
20	PU56467-1-3	A/C Head	
21	PQ41210	A/C Weight	
22	SSSH1430M	Screw	
23	SPSK1740M	Screw	
24	PQ40620	Special Screw	
25	PQ40756-1-3	Head Arm Spring	
26	Q03093-831	Washer	
27	PQM30002-111	Spring	
28	PQM30018-24	Washer	
29	REE2500	E-Ring	
30	PQ20084	Control Cam	
31	PQ30305A-2	Head Control Cam Ass'y	
32	PQ40624-1-1	Head Arm Lock Cam	
33	PQ40978	Tapping Screw	
34	PQ40627	Tapping Screw	
35	PQ30291-1-1	S. B. Control Cam	Search Brake
36	PQ40629	Tapping Screw	
37	PU56493C	Mode Control Switch	
38	PQ41402	Guide Plate	
39	SPSK1740M	Screw	
40	REE2500	E-Ring	
41	SPSK1750M	Screw	
42	PQ41208A	Shift Lever Ass'y	
43	PQM30017-14	Slit Washer	
44	PQ41029	Loading Gear (5)	
45	REE2000	E-Ring	
46	PQ40670-1-1	Middle Pole Stopper	
47	SPSK1740M	Screw	
48	PQ41303A	Center Gear Base Ass'y	
49	PQM30003-13	Belt	Reel
50	PQ41298A	Center Gear Ass'y	
51	SPSK1740M	Screw	
52	-	-	
53	REE1500	E-Ring	
54	PU57507	Clutch Gear	Supply
55	PQM30017-14	Slit Washer	

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
56	PU57508	Clutch Gear	Take-up
57	PQM30017-14	Slit Washer	
58	PQ40676-1-1	Idler Gear	Supply
59	PQM30017-14	Slit Washer	
60	PU56478-1-1	Reel Disk	Supply
61	Q03093-828	Washer	
62	PQM30017-5	Slit Washer	
63	PQ40679B	Tension Arm Ass'y	Supply, Incl. 64
64	PQM30001-185	Spring	
65	PQM30017-16	Slit Washer	
66	PQ40684B	Tension Band Plate Ass'y	Incl. 67
67	PQM30001-146	Spring	
68	PQM30013-3	Flange Collar	
69	SPSK1740M	Screw	
70	-	-	
71	PQ40686	Reel Gear	Take-up
72	Q03093-828	Washer	
73	PQM30017-19	Slit Washer	
74	PQ40687A	FF/REW Lever Ass'y	
75	PQ40689-1-2	FF/REW Bar	
76	PQM30017-14	Slit Washer	
77	PQM30017-19	Slit Washer	
78	PU57509	Take-up Arm	
79	PQ41301	Spring	
80	WNB2600N	Washer	
81	PQM30017-19	Slit Washer	
82	PU56480A	FF/REW Arm Ass'y	
83	Q03093-627	Spacer	
84	PQM30017-14	Slit Washer	
85	PQ40694A	Brake Arm Ass'y	Supply, Incl. 86
86	PQM30001-147	Spring	
87	PQ40697	Cancel Lever	
88	PQ40698A	Off Lever Ass'y	Incl. 89
89	PQM30001-143	Spring	
90	PQ40700	Eject Plate	
91	Q03093-829	Washer	
92	PQM30017-14	Slit Washer	
93	PQ40701-1-1	Rod	
94	PQ40705	Rod	
95	Q03093-829	Washer	
96	PQM30017-7	Slit Washer	
97	REE1500	E-Ring	
⚠ 98	PU56471V-1	Capstan Motor Ass'y	
99	SPSK1740M	Screw	
100	PQ41285A-2	Capstan Flywheel Ass'y	
101	SPSH1740M	Screw	
102	PQM30004-2	Belt	Capstan
103	PQ40711A	Capstan FG Plate Ass'y	
104	SPSH1740M	Screw	
105	PQ40739	REC Lever	
106	REE1500	E-Ring	
107	PQM30002-177	Spring	
108	SPSK1760M	Screw	

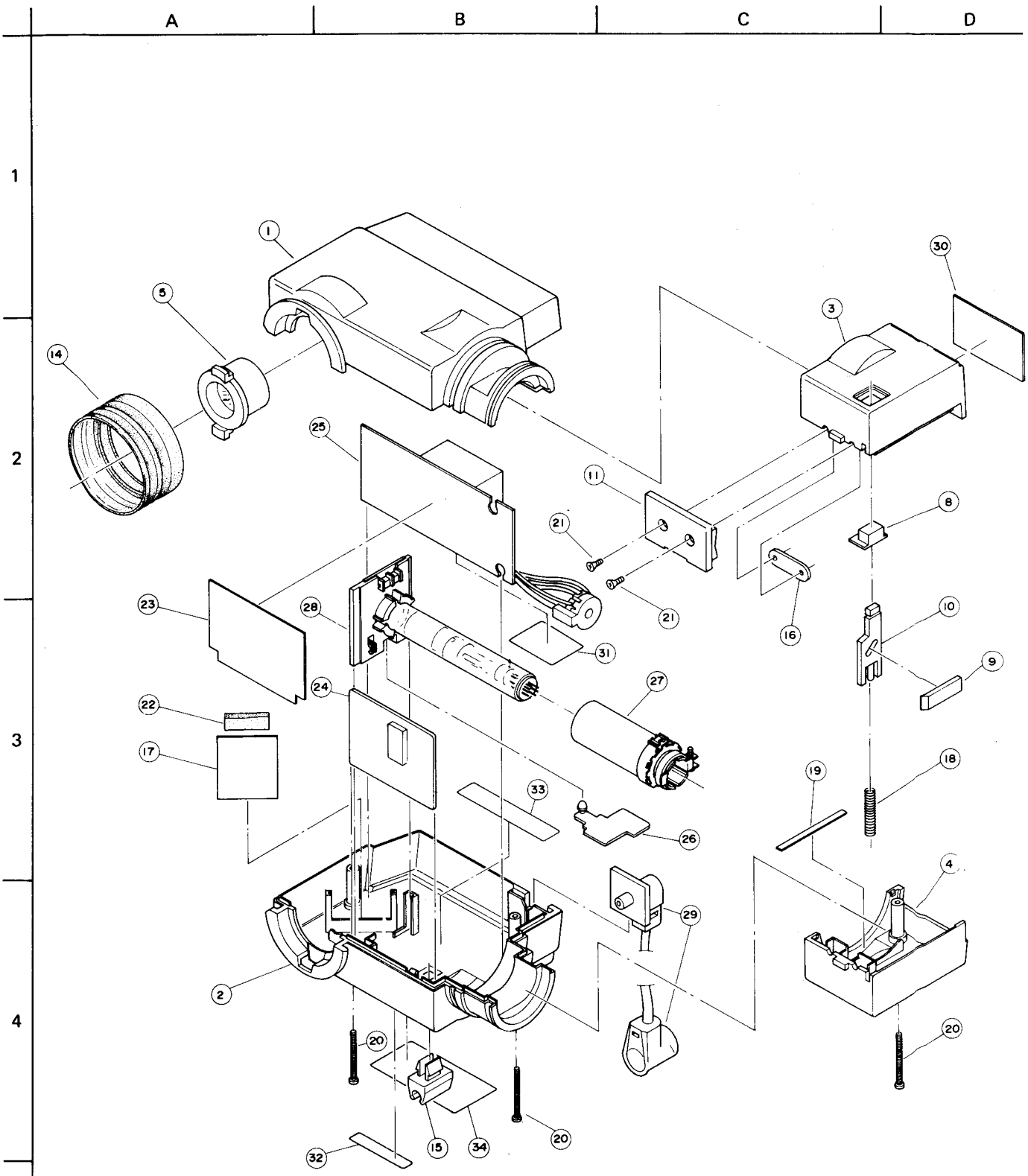
7.2.6 Optik



Optik

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
1	PU56300-1-1	Bias Light Ass'y	
⚠ 2	H4166	SATICON	
⚠ 3	PU56301	DEF. Yoke	
4	PU21809-1-1	Yoke Holder (A)	
5	SPBP2606Z	Screw	
6	SSBP2606Z	Screw	
7	PU56303	Yoke Holder (B)	
8	SPBP2608Z	Screw	
9	PU56304	Shield Cover	
10	-	Camera Pre-amp Board Ass'y	See Sect. 8.2.11.
11	LPSP2606Z	Screw	
12	PU57308	Shield Plate	
13	PU57201-1-1	Shield Cover	
14	PU56694	Insulator	
15	DPSP2608Z	Screw	
⚠ 16	PU56296	Optical Block Ass'y	
⚠ 17	PU56296-001	Servo Eye	
⚠ 18	PU56296-002	Motor Ass'y	Incl. Gear Box
23	PU56296-013	Zooming Lever	

7.2.7 Elektronischer Suchermonitor



Teileliste Suchermonitor

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ 1	PU56309-201	Top Case	
⚠ 2	PU56309-202	Bottom Case	
⚠ 3	PU56309-103	Top Holder	
⚠ 4	PU56309-104	Bottom Holder	
5	PU56309-205	Lens Case Ass'y	Incl. Lens & Lens Stopper
6	-	-	
7	-	-	
8	PU56309-108	Push Switch Knob	
9	PU56309-109	Stopper Pin	
10	PU56309-110	Stopper Lever	
11	PU56309-111	Shoe	
12	-	-	
13	-	-	
14	PU56309-154	Eyecup	
15	PU56309-115	Cord Clamper	
16	PU56309-116	Washer	
17	PU56309-117	Mirror	
18	PU56309-118	Spring	
19	PU56309-119	Leaf Spring	
20	PU56309-120	Screw	
21	PU56309-121	Screw	
22	PU56309-122	Soft Tape	
⚠ 23	PU56309-123	Insulator	
24	PU56309-150	Electronic VF Board (1)	See Sect. 8.2.12.
25	PU56309-151	Electronic VF Board (2)	See Sect. 8.2.13.
26	PU56309-152	Electronic VF Board (3)	See Sect. 8.2.14.
⚠ 27	PU56309-127	Deflection Yoke	
⚠ 28	PU56309-128	CRT Ass'y	Incl. CRT Masking & CRT Holder
⚠ 29	PU56309-129	VF Cable	
30	PQ30421-1	Name Plate	
⚠ 31	PU56309-139	Label	Caution: High Voltage
32	PU56309-132	Serial No. Label	
⚠ 33	PU56309-155	Caution Label	(# ~5000; PU56309-147)
⚠ 34	PU56309-148	Certification Label	
⚠ 35	PU56309D	Electronic VF Ass'y	Incl. [1] - [34]

8.2 Elektrische Teileliste

8.2.1 Mechacon/Servo Board Ass'y [01] PU10879D-2-C

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC1	NJM78L05A	Integrated Circuit	
IC2	UPC451G	Flat IC	
⚠ IC3	BA8506F	Flat IC	
IC4	BAF6305	Flat IC	
IC5	BA6324F	Flat IC	
⚠ IC6	S-81250AG	Integrated Circuit	
IC8	MN74HC244S	Flat IC	or TC40H244F
⚠ IC9	HD44860B12	Flat IC	
IC10	M54576FP	Flat IC	
IC11	UPD4071BG	Flat IC	
IC12	LC4011BM	Flat IC	
IC13	UPD4069UBG	Flat IC	
IC14	UPC451G	Flat IC	
IC201	UPC177G	Flat IC	
⚠ IC301	BA6132F	Flat IC	
IC302	UPC1251G	Flat IC	
IC401	LC4011BM	Flat IC	
Q1-3	DTC144K	Chip Transistor	or UN2213
Q4	2SB709	Chip Transistor	
Q5	DTC144K	Chip Transistor	or UN2213
Q6	2SB709Q.R.S	Chip Transistor	
Q7-10	DTA124K	Chip Transistor	or UN2112
Q11-14	DTC144K	Chip Transistor	or UN2213
Q15	2SB709	Chip Transistor	
Q16-18	DTC144K	Chip Transistor	or UN2213
Q19-20	DTA124K	Chip Transistor	or UN2112
Q22-23	2SD601	Chip Transistor	
Q24	DTC144K	Chip Transistor	or UN2213
Q25	2SD601	Chip Transistor	
Q26-34	DTC144K	Chip Transistor	or UN2213
Q35	2SB709	Chip Transistor	
Q36-39	DTC144K	Chip Transistor	or UN2213
Q40	2SD601	Chip Transistor	
Q42-44	DTC144K	Chip Transistor	or UN2213
Q46-47	DTC144K	Chip Transistor	or UN2213
⚠ Q48	2SB709	Chip Transistor	
Q49	DTA144K	Chip Transistor	or UN2113
Q201-Q203	DTC144K	Chip Transistor	or UN2213
Q204-Q209	2SD601	Chip Transistor	
Q213-Q215	2SD999	Chip Transistor	
Q303-Q304	2SB798	Chip Transistor	
Q307	2SB798	Chip Transistor	
Q403	DTC144K	Chip Transistor	or UN2213

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
D1	1SS133	Diode	
D2-3	DA204K	Chip Diode	
D5	MA151WK	Chip Diode	
D8-9	MA151WK	Chip Diode	
D10	ERB81-004	Diode	
D12	MA151WK	Chip Diode	
D13	RD5.6MB1	Chip Zener Diode	
D14-18	MA151WK	Chip Diode	
D19	MA151WA	Chip Diode	
D20-23	MA151WK	Chip Diode	
⚠ D25	RD2.7MB1	Chip Zener Diode	or RD2.7MB2.3 RD3.3MB1,2,3 RD3.9MB1,2,3
⚠ D26	RD3.9EB1	Zener Diode	or RD3.9EB2
D28	1SS133	Diode	or MA150
D201-D206	MA151WK	Chip Diode	
D207	DA204K	Chip Diode	
D301-D303	ERB81-004	Diode	
D402	MA151WK	Chip Diode	
D406-D408	MA151WK	Chip Diode	
⚠ CF1	PU50224	Ceramic Filter	
⚠ X1	PU47701	Crystal	
⚠ F1	QMF51E2-3R15	Fuse	Not included in M/S Board Ass'y
⚠	PU51212	Fuse Clip	
⚠ CP1-5	ICP-F15	Circuit Protector	
	PU57493	Rating Label	
	PU57179	DC Jack	
	PU57126	Insulator	
⚠ RY1	PU56400-2	Relay	
Strom Sensor Platine PU35449A-C			
⚠ Q501	2SB709	Chip Transistor	
⚠ Q502-Q503	DTC144K	Chip Transistor	or UN2213
⚠ C504	2SD601	Chip Transistor	
⚠ Q505	DTA124K	Chip Transistor	or UN2112
⚠ D501	MA151WA	Chip Diode	

8.2.2 Y-Chrome Platine 0 2
PU11083B-2-C

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC1	H8D1769	Integrated Circuit	
IC2	MCM1048B	Integrated Circuit	
⚠ IC3	MC5614	Integrated Circuit	
IC4	MC5378B	Integrated Circuit	
IC5	MC5575	Integrated Circuit	
IC6	MCM1057	Integrated Circuit	
IC7	H8D1741	Integrated Circuit	
IC8	MCM1068	Integrated Circuit	
IC9	MCM1058P	Integrated Circuit	
IC10	MC5365	Integrated Circuit	
IC11	-	-	
IC12	H8D1740	Integrated Circuit	
Q1-6	2SC1009A	Chip Transistor	
Q7	2SB624	Transistor	
Q8	DTC114YK	Chip Transistor	
Q9-10	2SC2787LF	Transistor	
Q11	DTC114YK	Chip Transistor	or UN2214
Q13	DTC114YK	Chip Transistor	or UN2214
Q16	2SC1009A	Chip Transistor	
Q17	DTA144K	Chip Transistor	or UN2113
D2	1SS133	Diode	or MAD150
C66	QCYA1HK-103Z	Chip Cap	
EQ1	PU56186-3	Equalizer	
EQ2	PU56186	Equalizer	
LPF1	PU57323-3	Low Pass Filter	
LPF2	PU57324	Low Pass Filter	
LPF3	PU56190-3	Low Pass Filter	
LPF4	PU57326	Low Pass Filter	
LPF5-6	PU57327	Low Pass Filter	
BPF1	PU57329	Band Pass Filter	
BPF2	PU57330	Band Pass Filter	
HPF1	PU56276	High Pass Filter	
DL1	PU57527	Delay Line	
DL2	PU55808	Delay Line	or PU57528
⚠ X1	PU31449-2	Crystal	

8.2.3 Audio/Servo Platine 0 4
PU10880B-2

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
	Audio Teil		
IC1	BA5112LS	Integrated Circuit	
IC2	MCM1055	Integrated Circuit	or 5VT15
IC3	MCM1053	Integrated Circuit	or 3VT03
Q1	2SB709	Chip Transistor	
⚠ Q2-3	2SD601	Chip Transistor	
Q4	DTC144K	Chip Transistor	or UN2213
Q5	2SD601	Chip Transistor	
⚠ Q6	DTA124K	Chip Transistor	or UN2112
D1-2	MA151WK	Chip Diode	
D3	RD4.7M	Chip Zener Diode	
D4	MA151WK	Chip Diode	
D5	MA151WA	Chip Diode	
⚠ D6	MA151WK	Chip Diode	
	Servo Teil		
IC101	BA6322F	Flat IC	
IC102	BA6322F	Flat IC	
IC103	BA6302AF	Flat IC	
IC104	BAF6305	Flat IC	
IC105	UPC451G	Flat IC	
IC106	BA6302AF	Flat IC	
Q101	2SB709	Chip Transistor	
Q102	2SD1119	Chip Transistor	
Q103	2SB709	Chip Transistor	
Q104-			
Q106	2SD1119	Chip Transistor	
Q107	2SB709	Chip Transistor	
Q108	2SD1119	Chip Transistor	
Q109	2SB709	Chip Transistor	
Q110	2SD1119	Chip Transistor	
Q111	2SD601	Chip Transistor	
Q112	2SD1119	Chip Transistor	
Q113	2SD601	Chip Transistor	
Q114	2SD1119	Chip Transistor	
Q115	DTC144K	Chip Transistor	or UN2213
Q116	DTC144K	Chip Transistor	or UN2213
Q117-			
Q119	DTA124K	Chip Transistor	or UN2112
Q120	DTC144K	Chip Transistor	or UN2213
Q121	DTA144K	Chip Transistor	or UN2113
D101	RD9.1MB2	Chip Zener Diode	or RD9.1MB3
D102	RD8.2MB1	Chip Zener Diode	or RD8.2MB2
D103	DA204K	Chip Diode	
D104	MA151WK	Chip Diode	
D105	MA151WK	Chip Diode	
D106	MA151WA	Chip Diode	
D107	MA151WA	Chip Diode	
D108	DA204K	Chip Diode	
D109	MA151WK	Chip Diode	
⚠ D110	1SS133	Chip Diode	
⚠ D111	1SS133	Chip Diode	

8.2.4 Bedienteil Platine [0 5] PU21793B

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
Q1-4	DTC114YK	Chip Transistor	or UN2214
D1-5	GL-1HD202	LED	STOP
D7	GL-1HD202	LED	PAUSE
D8-12	MA151WA	Chip Diode	or DAP202K
SW1-7	PU56384	Tact Switch	
⚠	PU57383-1-2	Tape Counter	

8.2.5 Löschkopf Platine [0 6] PU56815A

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC1	MCM1053	Integrated Circuit	or 3VT03

8.2.7 SSG Platine [2 1]

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC1	A7K09M93	Integrated Circuit	
IC2	NJM3415M	Integrated Circuit	
⚠ IC3	HD44007AFD	Integrated Circuit	
IC4	S115H98S	Integrated Circuit	
IC5	SP04S58A	Integrated Circuit	
⚠ Q1	2SA900S, T	Transistor	
Q2	2SB710R, S	Transistor	
Q3	2SB624	Transistor	
Q4	2SD601Q, R	Chip Transistor	
⚠ Q5	2SD975	Transistor	or 2SD781
Q6	2SD602Q, R	Chip Transistor	
Q7-8	2SC2778C	Chip Transistor	
Q9	2SD636Q	Transistor	
⚠ Q10	2SD975	Transistor	or 2SD781
Q11	2SD636Q	Transistor	
Q12	2SD601Q, R	Chip Transistor	
D1	1SS81	Diode	
D2	1SV68	Diode	
D3	1SS81	Diode	
⚠ D4	RD5.6EB3	Zener Diode	or RD6.2EB1
⚠ X1	PU56262	Crystal Unit	
⚠ TF1	PU48295	Thermal Fuse	
⚠ T1	PU56356-2	F. B. T.	

8.2.8 Kamera-Video Platine [2 2]

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC1	K119H99S	Integrated Circuit	
IC2	AN2110S	Integrated Circuit	
IC3	AN2310S	Integrated Circuit	
IC4	AN2320S	Integrated Circuit	
IC5	HA11776AMP	Integrated Circuit	
IC6	HA11777MP	Integrated Circuit	
Q1	2SJ84Q, R	F. E. T.	
Q2-3	2SC2778C	Chip Transistor	
Q4	2SA1022C	Chip Transistor	
Q5	DTC144K	Chip Transistor	or UN2213
Q6-7	2SC3064F, G	Transistor	
Q8-11	DTC144K	Chip Transistor	or UN2213
Q12	2SC2778C	Chip Transistor	
Q13	2SA1022C	Chip Transistor	
Q14-21	2SC2778C	Chip Transistor	
Q22	2SJ84Q, R	Chip Transistor	
D1	MA151WA	Chip Diode	
D2-3	MA151WK	Chip Diode	
D4	MA151WA	Chip Diode	
D5-6	MA151WK	Chip Diode	
D7	MA151WA	Chip Diode	
LPF1	PU54225	Low Pass Filter	
LPF2	PU56350	Low Pass Filter	
LPF3	PU56801	Low Pass Filter	
LPF4	PU56352	Low Pass Filter	
BPF1	PU54232	Band Pass Filter	
BPF2	PU57279	Band Pass Filter	
TRAP1	PU56348	Coil	
TRAP2	PU56349	Coil	
EQ1	PU57077	Equalizer	
EQ2	PU57078	Equalizer	
⚠ TH3	ERT-D2FGL251S	Thermistor	

8.2.9 Indikator Platine [2 3]

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC1	A1708W90	Integrated Circuit	
IC2	K1625R57SB	Integrated Circuit	
IC3	K114M59SB	Integrated Circuit	
IC4	NJM3414M	Integrated Circuit	
IC5	UPC1251G	Flat IC	
IC6	NJM4560M	Integrated Circuit	
IC7	UPD65003G	Integrated Circuit	
Q1	2SD601Q, R	Chip Transistor	
Q2	2SB709Q, R	Chip Transistor	
Q3	2SD601Q, R	Chip Transistor	
Q4-6	2SB709Q, R, S	Chip Transistor	
Q7-8	2SD601Q, R	Chip Transistor	
D2-3	MA151WK	Chip Diode	
D4	MA151WA	Chip Diode	
D5	RD3.3M	Chip Zener Diode	
D6	MA151WA	Chip Diode	
D7	MA151WK	Chip Diode	
DL1	PU57333	Delay Line	
DL2	PU57334-2	Delay Line	
⚠ PTH1	PU52108-101	Posistor	

8.2.10 Kamera Bedienteilplatine [24]
PU34670A-2

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
R1	PU54211	Slide VR	
R2	QVZ3531-471	VR	
SW1	PU54495	Slide Switch	CAMERA TEMP.
SW2	PU54495	Slide Switch	SENS. UP
SW3	PU54495	Slide Switch	AUTO WHITE
SW4	PU54214	Tact Switch	AUTO WHITE
SW5	PU56346	Push Switch	POWER

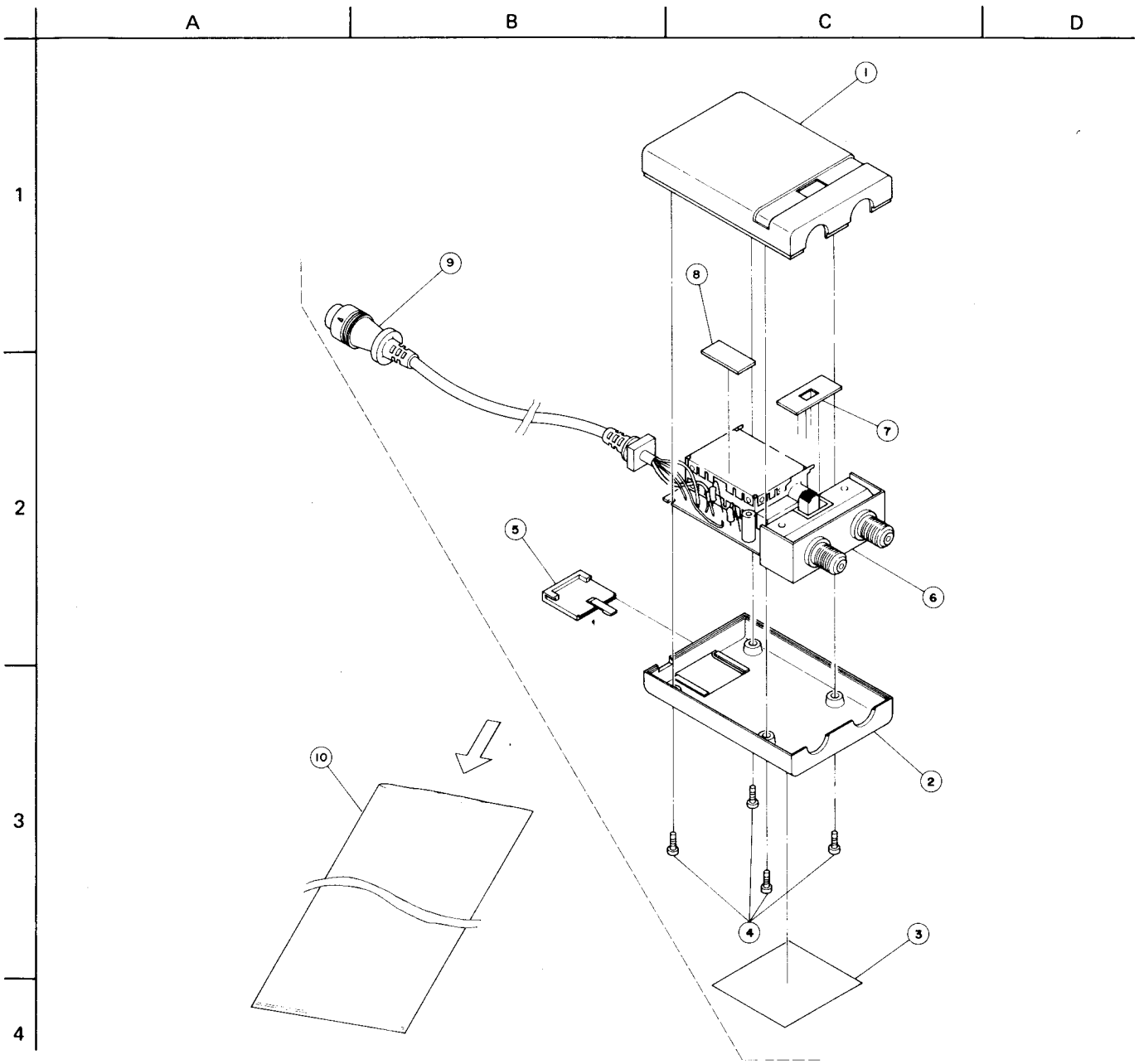
8.2.11 Kamera Vorverstärker [25]
PU56307A

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
Q1	2SK316Q	Chip F. E. T.	
D1	MA28WA	Chip Diode	

8.2.12 Suchermonitorplatine (1) (2) (3)
PU56309-153

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
	Monitor Platine (1) [28]		
	PU56309-150		
⚠ IC101	AN2510S	Integrated Circuit	
Q101	2SD958	Transistor	
D101	1SS209	Diode	
	Monitor Platine (2) [29]		
	PU56309-151		
⚠ IC201	TA78L005AP	Integrated Circuit	
D201	MA150	Diode	
⚠ D202	MA162	Diode	
⚠ D203	V06C	Diode	
⚠ D204	V11J	Diode	
⚠ Q201	2SD763	Transistor	
⚠ T201	KF7314V	Fly Back Trans	
⚠ TF201	D-98-3A	Thermal Fuse	
⚠ CP201	ICP-N10	Circuit Protector	
	Monitor Platine (3) [30]		
	PU56309-152		
Q301	2SD601	Transistor	
Q302	2SD601	Transistor	
D301	SG2-07D	Diode	

9.2 HF Modulator



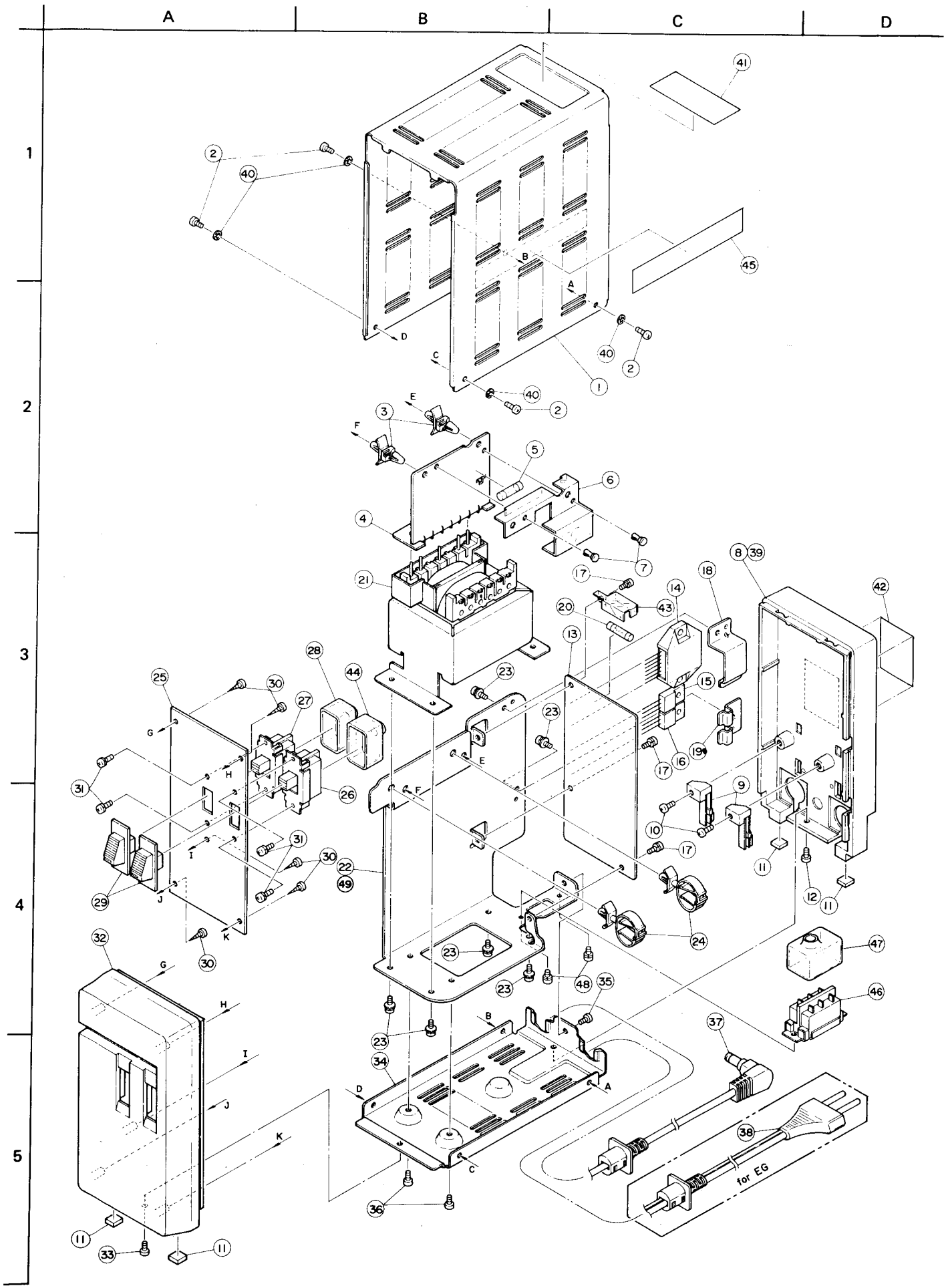
HF-Modulator Teileliste

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ 1	PU34945-4	Upper Case	
⚠ 2	PU11059-006	Lower Case	
⚠ 3	PU34964-4	Rating Label	
4	SPSB2608M	Screw	
⚠ 5	PU11059-007	Cap	
6	-	RF Unit board Ass'y	See Sec. 9.3
7	PU11059-005	Sheet	
8	PU11059-009	Cushion	
⚠ 9	PU11059-003	Cable Ass'y	
10	PU11059-025	Poly Bag	
⚠ 11	PU11059E	RF Unit	Incl. [1] - [10] , (RF-P1E)

9.3 HF-Modulator Platine PU110596-021

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC	LAG629	Integrated Circuit	
EQ	PU54838	Equarizer	
SW	PU11059-012	Switch	
⚠	PU11059-023	RF Converter Ass'y	

4.2 Teileliste Netzteil AA P-1EG



Teileliste AA P-1EG

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ 1	PU21799	Top Cover	
2	SDBP3006M	Screw	
3	PU55353	Supporter	
⚠ 6	PU56606	Fuse Cover	for F1
7	PU56629	Plastic Rivet	
⚠ 8	PU21801-3	Rear Panel	Incl. 39
9	PU56414-1-1	Leaf Switch	SW4, SW5
10	SBSB3008Z	Tapping Screw	
11	PU53256	Foot	
12	SDBP3006M	Screw	
⚠ 13	PU34672C-7	Regulator Board Ass'y	See Sec. 5.2. Incl. 14 - 16 , 20
14	STK772B	IC	See Sec. 5.2. IC 1
17	SBSB3006Z	Screw	
18	PU56604	Bracket (A)	
19	PU56605	Bracket (B)	
⚠ 21	PU56317	Power Transformer	
⚠ 22	PU21798	Heat Sink	
23	DPSP3006Z	Screw	
24	PU50259	Stand of Clip	
25	PU34671C-2	Control Board Ass'y	
⚠ 26	PU56320	Slide Switch	SW1 POWER ON/OFF
⚠ 27	PU56338	Slide Switch	SW3 VIDEO/CHARGE
⚠ 28	PU50479	Slide Switch Cover	for SW3
29	PU56412	Knob	
30	SBSB3008Z	Tapping Screw	
31	LPSP3006Z	Screw	
⚠	PU21800-5	Front Panel	
33	SDBP3006M	Screw	
⚠ 34	PU21797-2	Chassis	
35	SDBP3006R	Screw	
36	LPSP3006Z	Screw	
⚠ 37	PU56323	DC Cord	
⚠	QMP3960-200B	Power Cord	
39	PU56413	Battery Terminal	
40	WAS3000	Washer	
⚠	PU34696-6	Rating Label	
42	PU34996-2	Caution Label	
⚠ 43	PU57014	Fuse Cover (B)	for F2
⚠ 44	PU57142	Slide Switch Cover (B)	for SW1
⚠	PU56941-4-1	Caution Label	
⚠ 46	PU56321	Slide Switch	SW2 Voltage Selector
⚠ 47	PU57142	Slide Switch Cover (B)	for SW2
48	LPSP3006Z	Screw	
49	PQ30453	Circuit Board Cover	

5.1 Netztrafoplatine 0 1
PU56361C-4

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ C1	QEF52EM-223M	MM Cap	
⚠ L1	PU57297	Line Filter	

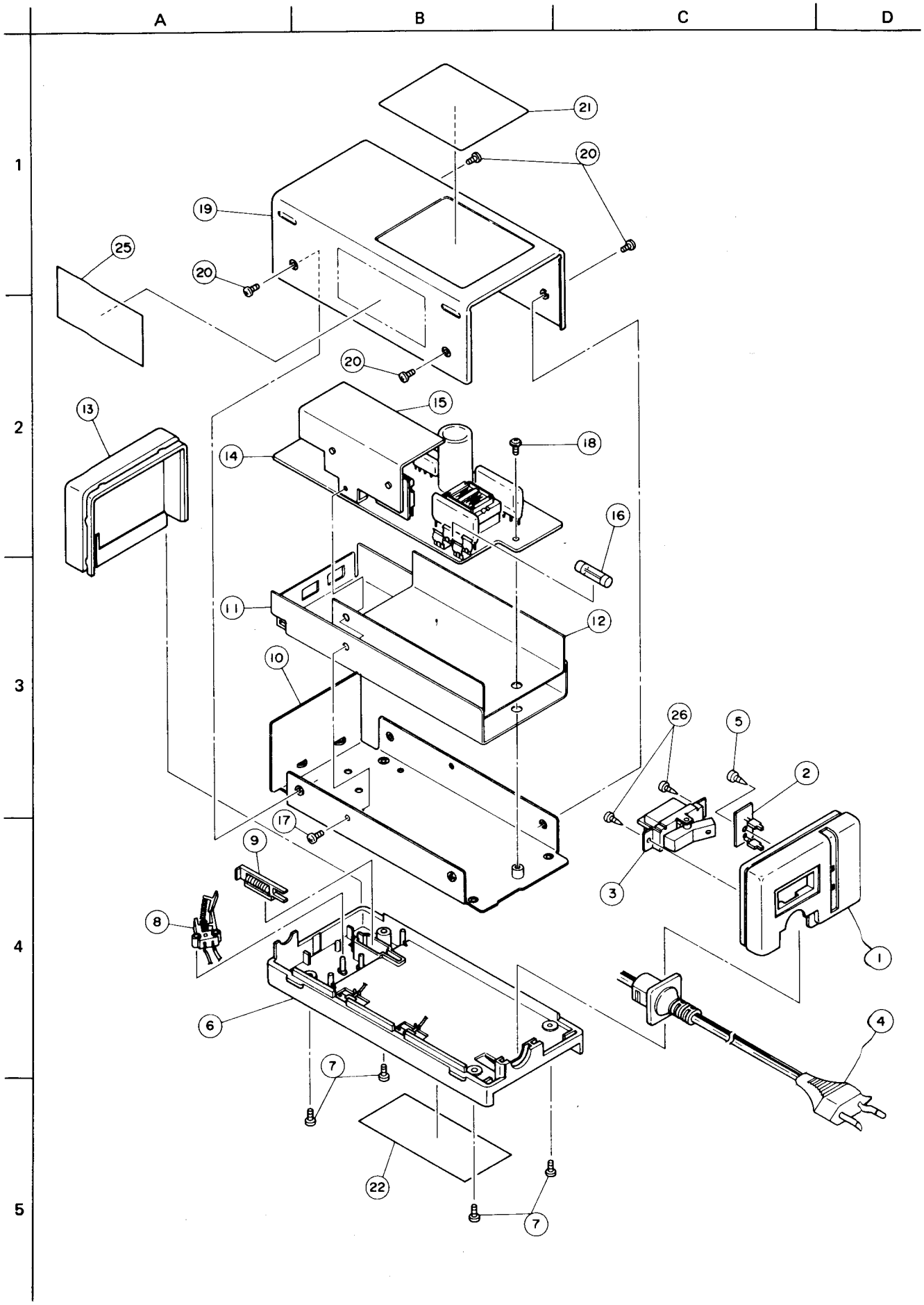
5.2 Reglerplatine 0 2
PU34672C-7

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ IC1	STK-772B	Integrated Circuit	
IC2	M5231L	Integrated Circuit	
IC3	UPC393C	Integrated Circuit	
IC4	-	-	
IC5	-	-	
IC6	M5278L05	Integrated Circuit	
⚠ Q1	2SB941P	Transistor	or 2SB761P
⚠ Q2	2SD1269P	Transistor	or 2SD960P
⚠ D1-2	20E2FC	Diode	
D3	MA162	Diode	
D4	RD6.8EB1	Zener Diode	
D5	MA150	Diode	
D6	21DQ04FC	Diode	
⚠ TF2	PU57504-011	Thermal Fuse	

5.3 Bedienteilplatine 0 3
PU34671C-2

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC4	BQ-058	Integrated Circuit	
IC5	AN6780	Integrated Circuit	
Q3	2SB644R	Transistor	
Q4	2SD637R	Transistor	
Q5	2SD637R	Transistor	
D11	SLP155B-01	LED	
D12	SLP155B-01	LED	
D13	MA150	Diode	
D14	RD4.7EB1	Zener Diode	
D15	MA150	Diode	
D16	-	-	
D17	RD6.8EB1	Zener Diode	
D18	Z1033F	Zener Diode	
R21	QRD187J-222	CR	
R22	QRD187J-472	CR	
R23	QRD187J-472	CR	
R24	QRD187J-104	CR	
R25	QRD187J-151	CR	
R26	-	-	
R27	QRD121J-471	CR	
R28	QRD187J-154	CR	
R29	QVZ3507-104	VR	
C21	QFN41HK-223	MY Cap	
⚠ C22	PU52802-107	E Cap	
C23	QFN41HK-223	MY Cap	
C24	QET41CM-107	E Cap	
C25	QET41CM-106	E Cap	
C26	QEE41VM-225	T Cap	
	PU56603	LED Spacer	for D11, D12
CN11	PU51260-5	Cap Housing	

4.2 Batterieladegerät BB-P1EG



Ersatzteilliste

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ 1	PU34952-2	Front Panel	
2	–	Sub Board Ass'y	0 2
⚠ 3	PU11061-047	Power Switch	
⚠ 4	PU11061-045	Power Cord	
5	SPSB2608Z	Screw	for 0 2
⚠ 6	PU11061-032	Battery Holder Ass'y	
⚠ 7	PU11061-006	Screw	(M3 x 4)
8	PU11061-007	Leaf Switch	
9	PU11061-008	Switch Terminal Pin	
⚠ 10	PU11061-009	Shield Plate Ass'y	
⚠ 11	PU11061-037	Insulator Plate (A)	
⚠ 12	PU11061-038	Insulator Plate (B)	
13	PU11061-023	Rear Panel	
14	–	Regulator Board Ass'y	0 1
15	–	Heat Sink	See Section 5.1.
17	PU11061-006	Screw	for Heat Sink (M3 x 4)
18	GPSP3005Z	Screw	for 0 1
⚠ 19	PU35227	Top Cover	
⚠ 20	PU11061-006	Screw	(M3 x 4)
⚠ 21	PU34951-5	Rating Label	
⚠ 22	PU34958-2	Caution Label	
23	–	–	
24	–	–	
⚠ 25	PU35164-3	Caution Label	
26	SDSB2608Z	Screw	for Power Switch

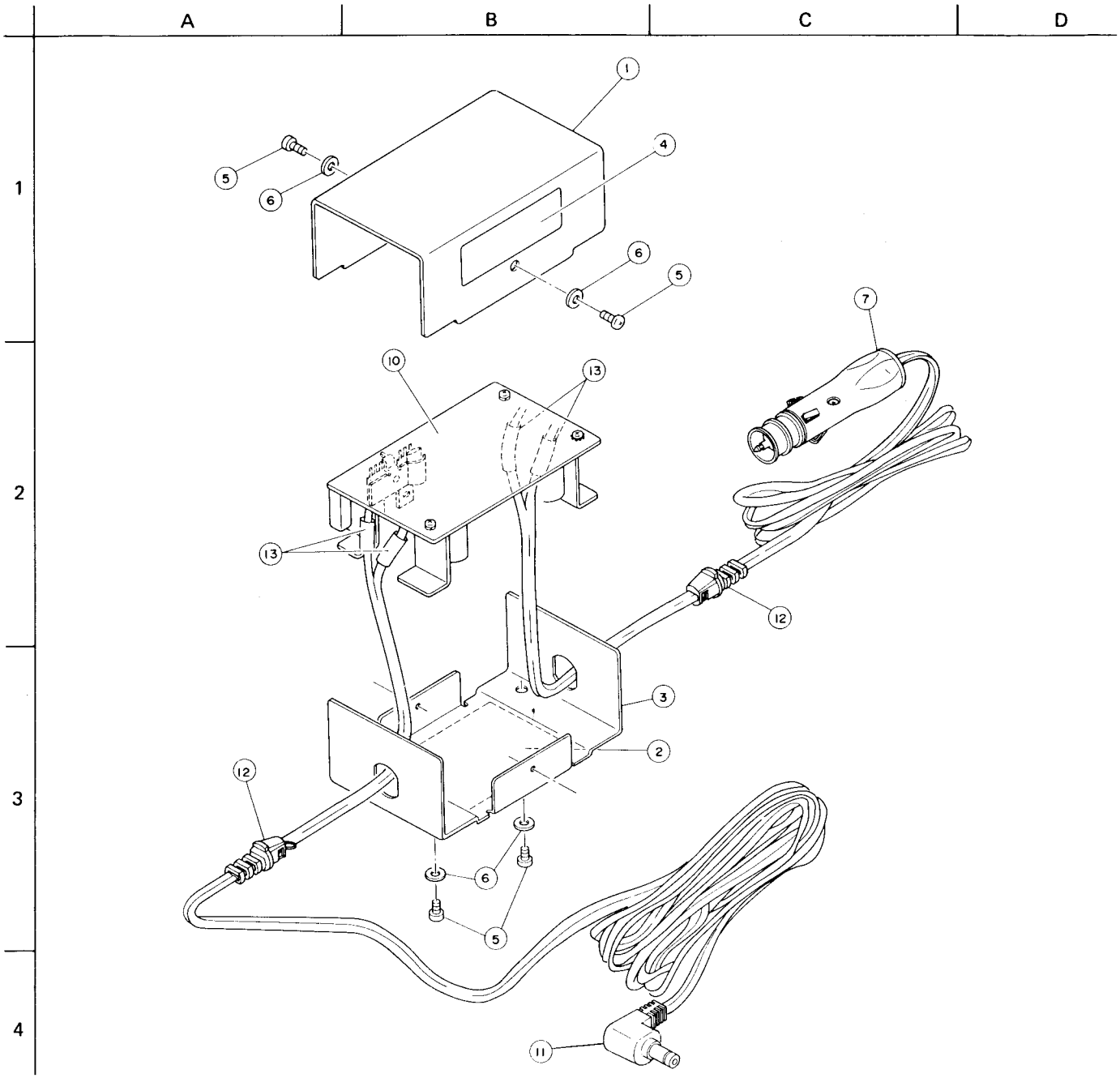
Reglerplatine BB-P1EG 0 1
PU11061-044

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ IC1	EHMJ11L96	Integrated Circuit	
IC2	AN6780	Integrated Circuit	
IC3	BQ-058	Integrated Circuit	
⚠ Q1	2SC3260	Transistor	
Q2-3	2SA564AR	Transistor	
Q4-5	2SB621AQ, R	Transistor	
Q6	2SD886P, Q	Transistor	
Q7-10	2SC828AP, Q	Transistor	
⚠ D1	S1WB60	Diode Bridge	
D3	MA150	Diode	
⚠ D4	F114B	Diode	
⚠ D5	RD4.7F	Zener Diode	
⚠ D6-8	V06C	Diode	
⚠ D9	S5KC20H	Diode	or MA649
D10	MA1180L	Zener Diode	
D11	MA1051M	Zener Diode	
D12	RK14	Schottky Diode	
D13	MA1150M	Zener Diode	
D16	MA1240	Zener Diode	
D17	V06C	Diode	
D18	MA1240	Zener Diode	
⚠ PHC1	ON3105	Photo Coupler	
⚠ T1	PU11061-030	Switching Trans.	
⚠ L1	PU53200-116	Filter Choke Coil	

5.2 Zusatzplatine (Sub Board) 0 2
PU11061-060

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
D14-15	SR538D	L.E.D.	

Autoadapter AP-P1E



Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
⚠ 1	PU34953-4	Upper Case	
⚠ 2	PU34984-4	Rating Label	
⚠ 3	PU11060-005	Lower Case	
⚠ 4	PU35359	Caution Label	
5	SPSP3005M	Screw	
6	Q03093-430	Nylon Washer	
⚠ 7	PU11060-033	Car Cord Ass'y	
10	PU11060-037	DC-DC CONV. PWB Ass'y	Ref. 4.1
⚠ 11	PU11060-020	DC Plug Cord Ass'y	
12	PU11060-002	Bushing	

AP-P1E Elektrische Teileliste
Wandler Platine PU11060-037

Symbol Nr.	Teile Nummer	Teile Name	Anmerkungen
IC1	TL494	IC	or UPC494 or MB3759
Q1	2SA1010	Transistor	or 2SB1019
D1	F114E	Diode	or D1R20
D2	S5KC20	Diode	or 5CH2M
D3	S3V	Diode	or GSA30
⚠ TF1	PU11060-034	Thermal Fuse	127℃